DIGITAL Server 9100 Series

User's Guide

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Digital Equipment Corporation

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DIGITAL Server 9100 Series User's Guide

Table of Contents

Preface

Who Should Read This Book

This book is written for the person who installs and administers the server.

How To Use This Book

This book is organized as follows:

- Chapter 1: Server Description – provides an overview of the server and its components
- Chapter 2: Installing and Removing System Components– procedures for installing and removing power supplies and hot-swapping a SCSI disk drive
- Chapter 3: System Security – provides information about system security
- Chapter 4: Troubleshooting – provides troubleshooting information (including error codes and some common problems and solutions)

Conventions Used

The following conventions are used throughout this guide to help you understand the text.

Symbols

The symbol > is used in showing you how to select a menu item. For example, the entry **System Config Utils>Execute SCU** instructs you to select the **Execute SCU** item in the **System Config Utils** menu.

Acronyms

The first time an acronym is used in a chapter, it is spelled out. Subsequent uses in the chapter show only the acronym. For example, the first time “System Configuration Utility” is used in the chapter, it is shown as System Configuration Utility (SCU). Later references to System Configuration Utility use SCU.

Typography

In this document, special typefaces are used to distinguish certain kinds of information.

`Courier`
Used for operator entry, commands, and screen messages.

Bold
Used for utility names and for emphasis in instructions.

Italics
Used for document names, path names, and file names.

CAPS
Keys and buttons are displayed in capital letters.

“Quotes”
Used for chapter and section references within the guide and for menu selections.

Special Notices

This book may contain special notices to you, which are labeled and described below:

Warnings – Text marked as WARNINGS alert you to situations where personal injury is possible.

Cautions – CAUTIONS indicate situations where equipment damage or data loss is possible.

Important – Text marked as IMPORTANT notifies you of significant and consequential information.

Related Publications

For additional information, refer to the following books:

- *DIGITAL Server 9100 Series System Software Guide*
- *DIGITAL Server 9100 Series Installation Guide*
- *DIGITAL Server 9100 Series Site Preparation Guide*
- *AMIDiag User’s Guide (available on the Quick Launch CD-ROM)*

Chapter 1

Server Description

The server uses Pentium® Pro symmetric multiprocessing (SMP) and peripheral component interconnect input/output (PCI I/O) to provide unparalleled reliability, investment protection, scalability, and price/performance.

The server provides superior processing and I/O power with support for four to eight Pentium Pro processors, four PCI busses, and up to three onboard SCSI (Small Computer System Interface) busses for the fastest application and network performance.

The server increases system availability through:

- ECC (Error Checking and Correction) memory
- Hot-swappable disk drives ("hot-swappable" refers to a component that you can replace with the system power on)
- Hot-swappable redundant power supplies
- Redundant cooling
- Integrated server management hardware and software

By providing internal expandability up to 12 SCSI disk drives, 4 gigabytes (GB) of memory, 15 PCI slots, and 4 EISA slots, the server provides world-class investment protection for even the fastest-growing customer applications.

This server system is designed for use in applications where downtime must be minimized. To this end, the server includes or has the option to include the following:

- **Optional power system redundancy.** In a system configured with the appropriate number of power supplies for redundancy (two in some system configurations and three in others), the system continues to operate with a single power supply failure.
- **Self-contained, hot-swappable power supply units.** Power supplies can be easily installed or removed from the back of the chassis. If you have a redundant power supply configuration, you can remove and install a power supply while the system is running.
- **Easily accessible SCSI drive bays.** The bays are accessible from the front of the chassis.
- **Hot-swappable SCSI drive backplane.** You can remove a failed drive and install a new drive without turning the system power off.
- **Failure monitoring.** Hardware monitors (temperature and voltage) and software monitors to indicate failures.

Warnings and Cautions

Overload condition, power supplies: The 625-watt power supplies are hot-swappable. You do not have to turn the power off when removing or installing power supplies. However, if you remove a power supply with the power on, your server must have a redundant power supply configuration. Otherwise, an overload condition might occur and cause the system to shut down.

Electromagnetic interference (EMI), removable media bays: The system has four 5.25-inch half-height bays accessible from the front. These bays are convenient for diskette, tape, and CD-ROM drives (removable media). Because of the EMI generated by hard drives and the increased susceptibility to electrostatic discharge (ESD), we do not recommend putting hard drives in the 5.25-inch half-height bays.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the power cord, telecommunications systems, networks, and modems attached to the system before removing the covers from the system.

Exceeding limits, accessory/option adapter boards: Accessory/option adapter board outputs may exceed National Electrical Code (NEC) Class 2 or limited power source limits and must be installed with the appropriate interconnecting cabling in accordance with NEC regulations.

Terms, Conventions, and Related Documents

Refer to the “Preface” of this document for important information on how to use this book, terms and conventions, and related documents.

When used in this chapter, the term “configuration utility” refers to the SCU (System Configuration Utility). The “Configuring Your Server” section of Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide* discusses how to use this utility in detail.

Typical Configurations

A typical configuration for a server with two system boards could include the following:

- 1 GB memory
- Six processors
- Three processor boards and one termination board
- Diskette drive
- Six SCSI hard drives in a RAID configuration (Redundant Array of Independent Disks)
- Two SCSI drive backplanes
- CD-ROM drive
- Two 625-watt power supplies

Expanding the Server Configuration

As server/client needs grow, you can expand the system by adding processors, memory, drives, and power supplies. Following is a description of the expandability limits for the above components:

- The primary system board and the secondary system board have two slots each for processor boards. Either a processor board or a bus termination board must be plugged into each processor board connector.
- 4 GB memory board supports 16 DIMM (Dual Inline Memory Module) devices for a minimum memory size of 128 MB up to a total of 4 GB of memory. Maximum of two memory boards for dual system board configurations.
- The primary system board has four EISA and seven PCI slots for add-in boards. (The fourth add-in board slot from the bottom is a shared PCI/EISA bus slot. The term “shared” indicates that there is a PCI and an EISA slot accessible from one external add-in board slot.) The secondary system board has eight PCI slots.
- Chassis can hold 17 drives: 12 hot-swap bays for 3.5-inch SCSI-2 SCA (Single Connector Attachment) hard drives; four 5.25-inch half-height bays for removable media drives; one 3.5-inch bay with diskette drive already installed.
- Chassis supports from one to three power supplies.

System Features Summary

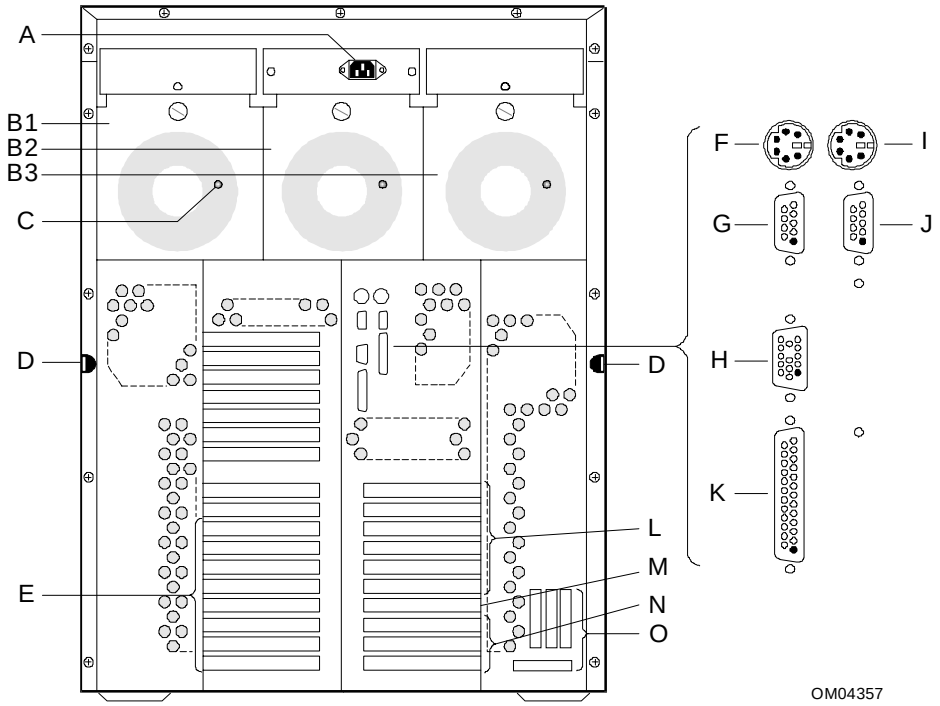
The following table summarizes the features of the system.

Feature	Description
Modular board set	System is intended for use with a modular board set based on Pentium Pro technology; it supports up to eight processors and up to 8 GB of memory.
Add-in board support	Rail and back panel slots support up to 18 add-in boards.
3.5-inch diskette drive	A 3.5-inch diskette drive is externally accessible.
12 locations for 3.5-inch SCSI-2 hard drives	Two backplanes each hold six 3.5-inch hot-swappable SCSI-2 hard drives (for a total of 12 SCSI drives). The drive bays are secure behind a lockable metal EMI door. You can swap drives in or out of the system with power on. The array of drives allows easy setup of RAID applications.
Hot-swappable backplane	A hot-swappable backplane is part of each 3.5-inch drive bay assembly for SCSI drives. The backplane is designed for wide and fast SCSI-2 devices that use the industry standard 80-pin Single Connector Attachment (SCA). Each backplane consists of two rows of three drive connectors. A system may contain one or two of these backplanes (supporting 6 or 12 drives).
Four locations for removable media drives	Four externally accessible 5.25-inch half-height bays are available for diskette, CD-ROM, and/or tape drives.
Power supply	From one to three hot-swappable 625-watt auto-ranging power supplies are easily removed and installed. The server configuration requires a minimum of two power supplies.
Cooling fans	Each power supply has an integral cooling fan. In addition, there are eight fans within the cabinet to provide cooling for boards and drives.
Security	**Mechanical**: Two metal padlock loops (at the back of each side panel). Two intrusion sensors (one on each side panel). A padlock loop and an intrusion sensor (at the metal EMI door). **BIOS**: Security menu offers a range of security options (for example, setting administrative and user passwords, Password on Boot, Video Blanking, Secure Mode Timer). **SCU**: Security Subsystems Group options available include, for example, Lockout Timer, Secure Boot Mode, Floppy Write Protect, Reset/Power Switch Locking). For more information on system security, see “System Security” in this chapter.
Software-related utilities, setup	Diagnostic Partition, BIOS Setup Utility, System Configuration Utility (SCU), SCSI*Select*™ Utility.
System management	Inter-Integrated Circuit interface (I^2C) for diagnostic and intra-chassis communication.

Chassis Back Features and Controls

The following figure shows the chassis back features and controls.

Chassis Back Features and Controls

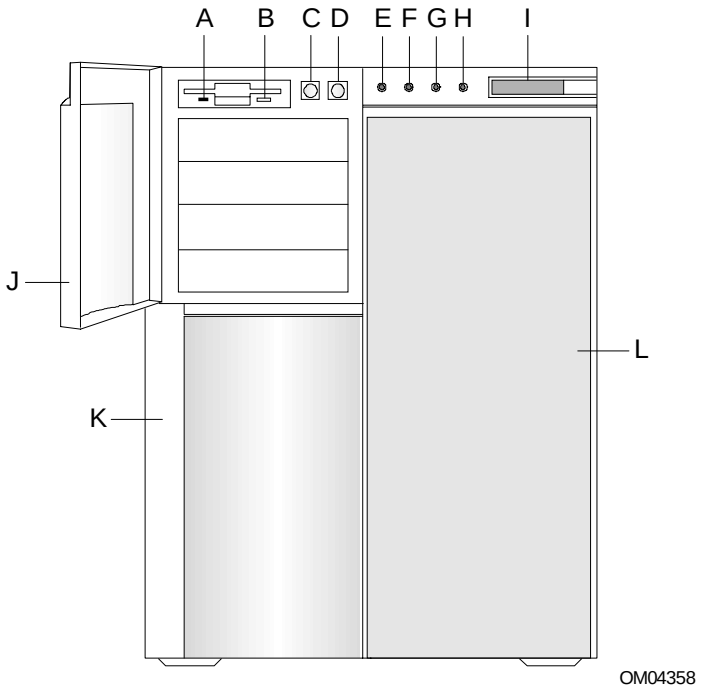


A	AC input power connector	Single input for 240 volts	
B	Power supplies (3 shown) B1 = Power supply 1 B2 = Power supply 2 B3 = Power supply 3	Two supplies: Three supplies:	High-end system (required for this server configuration) High-end system (required for N+1 redundancy)
C	Power supply status LEDs	Status descriptions: Green LED on LED off	 Power supply is good. Indicates a power supply failure if the system is on.
D	Side cover padlock loops	One on each side, at the back	
E	PCI slots	Eight dedicated PCI slots (secondary system board)	
F	Keyboard	PS/2-compatible 6-pin connector	
G	COM2	Serial port 9-pin connector.	
H	VGA	VGA monitor 15-pin connector	
I	Mouse	PS/2-compatible 6-pin connector	
J	COM1	Serial port 9-pin connector.	
K	LPT1	LPT1 25-pin parallel port connector	
L	PCI slots	Six dedicated PCI add-in board slot locations (primary system board)	
M	PCI/EISA slot	One shared PCI/EISA slot (primary system board)	
N	EISA slots	Three dedicated EISA add-in board slot locations (primary system board)	
O	Knockouts	Available to route SCSI signals to peripheral boxes	

Chassis Front Features and Controls

The following figure shows the chassis front features and controls.

Chassis Front Features and Controls



A	Activity light for 3.5-inch diskette drive	When lit, drive is in use.
B	Ejector button for 3.5-inch diskette drive	Press to eject diskette.
C	Power on/off switch (convex button)	Press to turn system DC power on or off. For system security, the power-off function can be disabled via the BIOS Secure Mode option.
D	Reset switch (concave button)	Press to cause a hard reset to the system; the power-on self-test (POST) runs. The Reset switch can be disabled via the BIOS Secure Mode option.
E	LED status indicator: Power-on, green	When lit, power is present in system (+5 Vdc). When off, power is turned off or the power source is disrupted.
F	LED status indicator: Power-fail, yellow	When lit, indicates either a power supply failure or an intrusion event (removal of a cover with power on).
G	LED status indicator: Fan-fail, yellow	When lit, a fan has failed.
H	LED status indicator: Drive-fault, yellow	When lit, a SCSI drive has failed.
I	LCD panel	Displays information about processor type. May be customized with user-designated string (via the SCU).
J	Small bezel door	Open panel to access removable media bays
K	Front cover	Cosmetic panel
L	Large bezel door	Open panel to access up to 12 hard disk bays

SCSI Drive Status LED Descriptions

You can pinpoint a faulty SCSI drive to remove by checking the status LEDs. The LEDs occur in sets of three above each of the 12 drive bays. The following table shows the meaning of the status LEDs.

SCSI Drive Present, Power On Green LED	SCSI Drive Active Green LED	SCSI Drive Faulty* Yellow LED	Description and Action If Needed
◎ On	○ Off	○ Off	Drive is present with power.
◎ On	✳ Blinking	○ Off	Drive is present with power and is being accessed.
○ Off	○ Off	◎ On	Drive CAN be replaced. Steady yellow fault light indicates drive has a problem. Power to drive is off.
◎ On	○ Off	✳ Slow blinking	Drive SHOULD NOT be replaced at this time. A slowly blinking yellow fault light indicates a drive that has just been replaced is in recovery mode (drive array being rebuilt). Power to drive is on.
○ Off	○ Off	○ Off	There is no drive installed in the bay or system power is off.

* Table assumes a SCSI host controller is installed to send SAF-TE (SCSI Accessed Fault-Tolerant Enclosures) control signals to the drive fault LED.

Note: The DIGITAL Server 9100 series utilizes a Fault Reporting mechanism called SAF-TE (SCSI Accessed Fault Tolerant Enclosure) for reporting hot-swap disk drive activity and status. All other DIGITAL Servers as well as external Expansion Cabinets use the DIGITAL Fault-Bus for reporting of hot-swap disk drive activity and status. The Mylex RAID controllers provide support for both types of fault reporting and are shipped configured for SAF-TE when factory installed or DIGITAL Fault-Bus when ordered as standalone options. A RAID controller can be configured for SAF-TE or Fault-Bus **but not both**. Consequently, a RAID controller configuration with one channel connected to internal hot-swap disk drives (SAF-TE) and another channel connected to an expansion cabinet (Fault-Bus) is not supported.

Front Panel Interface

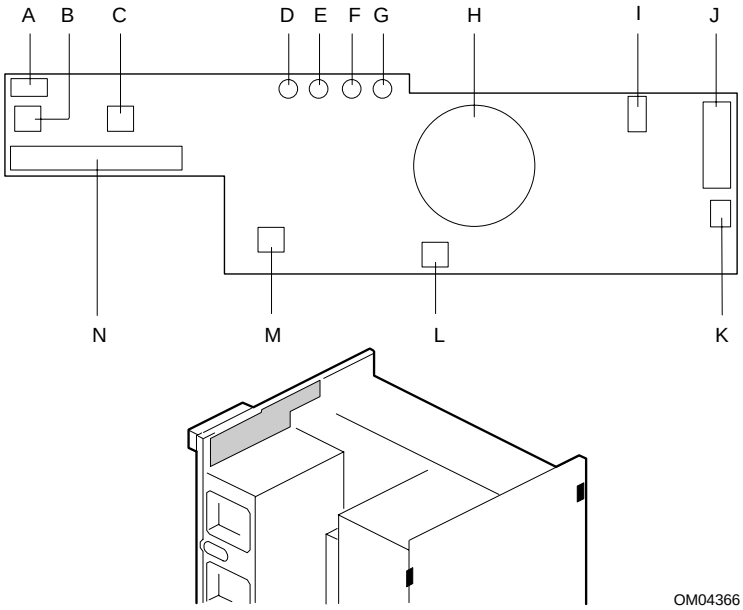
The system front panel control board contains these components:

- Power and reset switches
- System speaker
- LED indicators for power-on, power-fail, fan-fail, and drive fault
- LCD character display
- Chassis intrusion alarm switch connectors

The LCD displays two lines of 16 characters each. You can modify the LCD display through the configuration utility. The electrical interface is compatible with commercially available LCDs. For information on customizing the LCD display, refer to Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide.*

The upper portion of the following figure shows the front panel control board as viewed from the front. The lower portion of the figure shows the location of the board as installed in the chassis.

Front Panel Control Board



A	Signal from intrusion switch at back edge near power supply three; 3-pin, right-angle, latching-style connector
B	Power on/off switch
C	Reset switch
D	Power-on LED, green
E	Power-fail LED, yellow
F	Fan-fail LED, yellow
G	Drive-fault LED, yellow
H	Speaker
I	Signal from intrusion switch at back edge near power supply one; 3-pin, right-angle, latching-style connector
J	Signal interface to LCD; 14-pin, straight-head connector
K	Power to LCD; 3-pin, straight-head, latching-style connector
L	Hard drive bay intrusion switch (from EMI door intrusion sensor)
M	NMI switch (not a button switch; a recessed switch accessible through a small hole)
N	Signal interface to primary system board; 40-pin, straight-head connector (pin 17 removed)

System Board Sets

The “system board set” reflects the type and number of boards available for a particular configuration.

Board Set for a Dual System Board Configuration

The system board set for a dual system board configuration includes the following:

- Primary and secondary system boards
- Up to four processor boards
- One to two memory boards
- Bus termination board (required in any slot in which processor board is not installed)

Primary System Board Features

The following table summarizes the primary system board features.

Primary System Board Feature	Description
Multiple processor support	Two processor board slots. Up to Four Pentium Pro microprocessors (two on each processor board). Either a processor board or a bus termination board must be plugged into the system board.
Upgradable memory	One slot for memory board, supporting up to 4 GB memory using 256 MB DIMMs. **Note:** System memory data coherency is maintained using a Line Status Table (LST) SIMM on the system board. Whenever a memory board is resident, an LST SIMM module must also be resident.
Add-in board support	Three dedicated EISA bus slots Six dedicated 32-bit PCI slots; dual (peer) bus architecture One shared PCI/EISA slot
SCSI controllers	Two onboard SCSI-2 controllers; Ultra SCSI channel support (PCI-based)
BIOS	Flash memory-based BIOS (Basic Input/Output System) and Setup utilities
Intermodule connector	Used to connect the primary and secondary system boards. A 266-pin receptacle-type connector into which the secondary system board is plugged.
Video	Integrated super VGA controller chip with 1 MB of video memory
External device connectors	Onboard connectors for two serial ports, parallel port, PS/2-compatible keyboard and mouse, and VGA monitor
Clock	Real-time clock/calendar (RTC) chip
System hardware monitoring	Detects chassis intrusion and contains sensors for temperature, voltage, and fan failure

Secondary System Board Features

The following table presents the secondary system board features.

Secondary System Board Feature	Description
Multiple processor support	Two slots for processor board slots. Up to four Pentium Pro microprocessors (two on each processor board). Either a processor board or a bus termination board must be plugged into the system board.
Upgradable memory	One slot for memory board, supporting up to 4 GB memory using 256 MB DIMMs. For an eight-processor system, both system boards must contain a memory board with an equal amount of memory. **Note:** System memory data coherency is maintained using a Line Status Table (LST) SIMM on the system board. Whenever a memory board is resident, an LST SIMM module must also be resident.
Add-in board support	Eight dedicated 32-bit PCI slots on secondary system board; dual (peer) bus architecture
SCSI controller	One onboard SCSI-2; Ultra SCSI channel support (PCI-based)
Intermodule connector	Used to connect primary and secondary system boards. On the secondary system board, this is a plug-type connector which is inserted into the intermodule connector receptacle on the primary system board.

Configuration Restrictions for System Boards

Certain restrictions have been defined for configuring the primary and secondary system boards to optimize server performance.

Configuration Restrictions for the Primary System Board

Following are the configuration restrictions for the primary system board:

- The maximum number of PCI and EISA adapters you can install on the primary system board is 10, in either of the following configurations:
  - 6 PCI and 4 EISA
  - 7 PCI and 3 EISA
- On the primary system board, either a processor board or a bus termination board must be plugged into the second processor board slot.
- If you install a video controller adapter in one of the PCI bus 0 or EISA slots, the onboard VGA controller is disabled. You must attach the monitor to the add-in video controller.

Configuration Restrictions for Both System Boards

Following are the configuration restrictions that apply to both system boards:

- For systems with up to seven processors, the memory board on primary system board is filled first with memory modules. Once that memory board is full, the second memory board on the secondary system board is added and populated.
- For systems with eight processors, a memory board is put on each system board and must contain a balanced memory load (a minimum of 128 MB per memory board for a total minimum of 256 MB).
- On the secondary system board, either a processor board or a bus termination board must be plugged into each processor board connector (CPU 3 and CPU 4).
- All processors on the system boards must be of the same speed and cache size.
- If any memory board is installed on a system board, an LST SIMM module must be installed in the LST SIMM socket. If 200 MHz/1 MB cache processors are resident, use a 1024K LST SIMM module. If both system boards contain an LST SIMM module, then the LST SIMM module must be the same size.

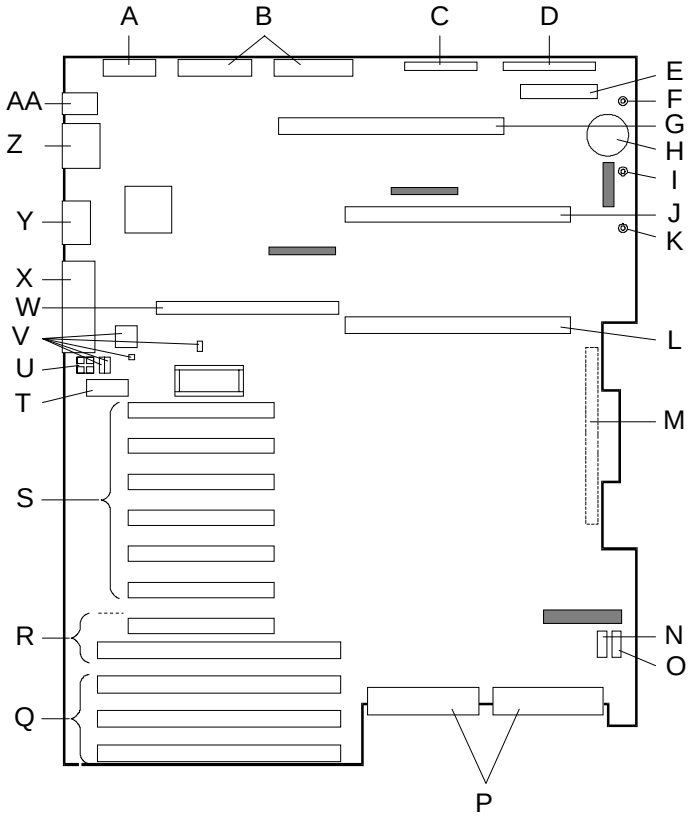
Note: To read about restrictions on configuring specific add-in boards, refer to “Configuration Restrictions for Add-in Boards” later in this chapter.

To read about configuration restrictions for memory boards, refer to “4 GB Memory Board DIMM Configuration Restrictions,” which appears later in this chapter.

Primary System Board Connector and Component Locations

The following figure shows the connector and component locations on the primary system board.

Connector and Component Locations on the Primary System Board



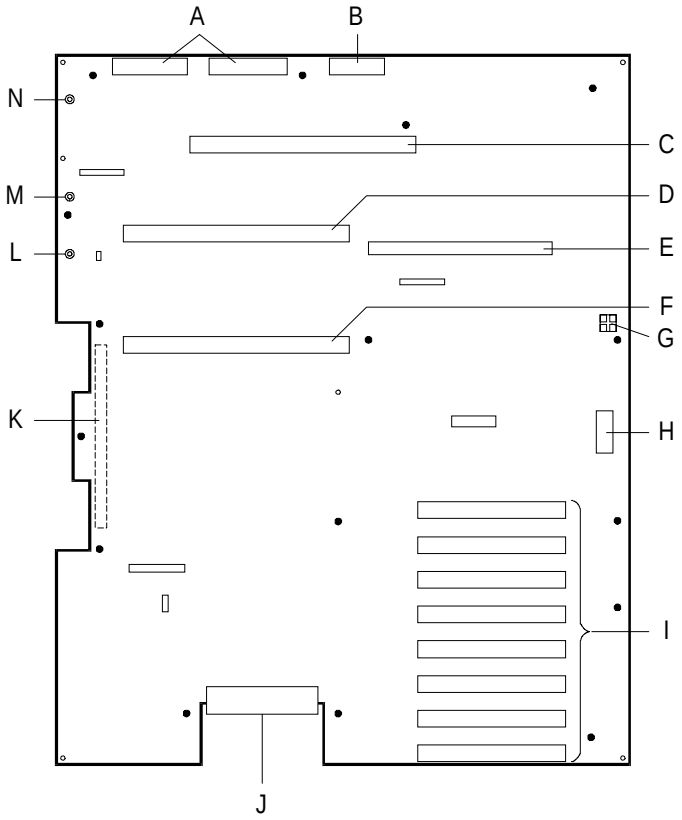
Label	Connector/component	Label	Connector/Component
A	Power control and status (PS3)	O	I^2C connector (not used)
B	+5 V, +12 V, and 3.3 V power connectors (PS1 and PS2) (identical)	P	SCSI bus connectors: Channel A to the right, Channel B to the left
C	Diskette drive connector	Q	EISA slots 2, 3, and 4 for add-in boards (slot 2 toward top, 4 at bottom)
D	Front panel connector	R	Shared slot for PCI (slot 7) and EISA (slot 1) add-in board
E	Connector–Not Used	S	PCI slots 1-6 for add-in boards (slot 1 at top; Bus 0=slots 1-3, 7; Bus 1=slots 4-6)
F	12 V power plane connector	T	3.3 V PCI power connector
G	Memory board connector	U	Processor LEDs (DS1, DS2, DS3, DS4)
H	Real-time clock battery	V	Configuration switches and jumpers
I	5.1 V power plane connector	W	LST SIMM connector
J	CPU 2 processor board or termination board connector	X	Parallel port connector
K	3.3 V power plane connector	Y	VGA monitor connector
L	CPU1 processor board connector	Z	Serial port connectors A (COM1) and B (COM2)
M	Intermodule connector (on back side of board)	AA	PS/2-compatible keyboard & mouse connectors
N	Fan fail connector (inner chassis fans)		

Secondary System Board Connector and Component Locations

The following figure shows the connector and component locations on the secondary system board.

Note: A secondary system board is only available on DIGITAL Server 9105 (FR-M2A2W-BX) or provided as part of an upgrade to the DIGITAL Server 9100 (FR-M2A2W-AX).

Connector and Component Locations on the Secondary System Board



Label	Connector/component
A	+5 V, +12 V, and 3.3 V power connectors (PS1 and PS2) (identical)
B	Power control and status (PS3)
C	Memory board connector
D	CPU 4 processor board or termination board connector
E	LST SIMM connector
F	CPU 3 processor board connector
G	Processor LEDs (DS1, DS2, DS3, DS4)
H	3.3 V PCI power connector
I	PCI slots 8-15 for add-in boards (numbered from top to bottom: 12, 13, 14, 15, 8, 9, 10, 11; Bus 2=slots 8-11; Bus 3=slots 12-15)
J	SCSI bus connector Channel C
K	Intermodule connector (located on back side of board)
L	3.3 V power plane connector
M	5.1 V power plane connector
N	12 V power plane connector

Processor Boards

The system must include a minimum of two and up to four processor boards (two per system board) capable of supporting up to eight Pentium Pro processors (two per processor board). Each processor board has two processor sockets. The board contains termination circuitry required by the GTL+ signaling environment, DC to DC converters for power to each processor and termination circuitry, and logic for I^2C support and clock ratio programming.

The primary system board has two connectors for processor boards: CPU 1 and CPU 2. Processor boards must be filled on the primary system board first. The secondary system board also has two connectors: CPU 3 and CPU 4. Each connector has subtle differences in pinout. Either a processor board or a bus termination board must be plugged into each processor board connector.

Processors

The server supports the following types of processors:

- Single 200 MHz Pentium Pro with integrated 512 KB write-back cache
- Dual 200 MHz Pentium Pro with integrated 512 KB write-back cache
- Single 200 MHz Pentium Pro with integrated 1 MB cache
- Dual 200 MHz Pentium Pro with integrated 1 MB cache

On the secondary system board, you can upgrade with a single processor per board to two processors per board with a processor upgrade kit. Four processors are required on the primary system board.

Processor activity is indicated by LEDs on each system board. Flashing red LEDs indicate normal processor activity. If lit solid or if the LED light is off, the processor may have failed. Refer to the previous sections on board connectors and component locations to determine the location of processor LEDs on the system boards.

Bus Termination Board

Either a bus termination board or a processor board must be plugged into each processor board connector. The termination board provides GTL+ (Gunning Transceiver Logic) signal termination and voltage regulation.

Memory

The memory subsystem consists of the following:

- Memory chipset
- Memory board connector on the primary and secondary system boards
- Memory board
- LST SIMM module

The system board contains the data path and data control portions of the chipset. The server uses DIMMs (Dual Inline Memory Modules).

Note: The server supports 8 GB of DIMM memory on two memory boards, one per system board; however, Windows NT Server 4.0 only supports a maximum of 4 GB of system memory.

4 GB Memory Board

The 4 GB memory board contains the buffer devices from the chipset and 16 DIMM sockets arranged in eight banks. When the board is fully populated using 256 MB DRAM DIMMs, it provides for a total of 4 GB of system memory.

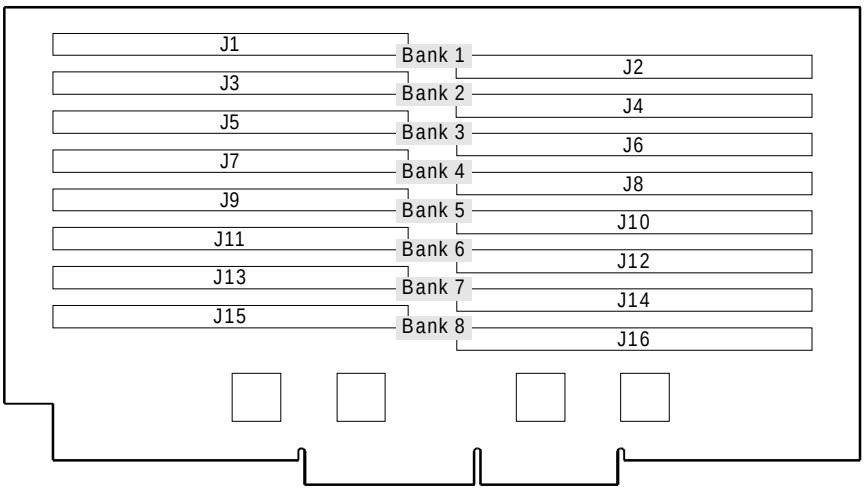
DIMM sockets on the board are organized as two 72-bit wide banks. DIMMs must be placed in groups of four identical DIMMs. Therefore, the board is populated by placing DIMMs in two, four, six, or eight banks.

The DIMM slots should be filled starting from the outside edge of the board (nearest the memory board ejector tabs). Memory banks must be filled completely (with four DIMMs) and consecutively starting with Bank 0

DIMM sockets accept 168-pin single- or double-density DIMMs. DIMMs may vary in size from one bank to another.

Note: Only use DIMMs approved for use in this server system. Refer to the “4 GB Memory Board DIMM Configuration Restrictions” section that follows, or call your customer service representative for information.

4 GB Memory Board



4 GB Memory Board DIMM Configuration Restrictions

The following restrictions apply to DIMM configuration on the 4 GB memory board.

- The first bank in the first row should be populated first. If BIOS does not detect a memory module in the first row, it assumes that no memory is present. The first row is on the outside edge of the memory board, furthest from the system board.
- DIMMs are populated in groups of four; therefore, DIMMs are added in 2, 4, 6, or 8 groups.
- The slowest DIMM on the board must occupy slot J1.
- DIMMs within a bank must be of the same size and speed.
- Use only 32 MB, 128 MB, or 256 MB DIMMs on the 4 GB memory board.
- Use only 72-bit, 168-pin 60ns or 70 ns fast page mode DIMMs.
- An LST SIMM board must be present in the LST SIMM socket whenever a memory module is present in the memory slot.
- The LST SIMM module is available in 256K and 1024K sizes. If both system boards contain an LST SIMM module, the LSTs must be the same size.
- When a memory configuration is increased to above 256 MB, the size of the LST SIMM must be upgraded from 256K to 1024K.

Other Memory Board Considerations

- For systems with eight processors, two memory boards with an equal amount of memory must be installed.
- For systems with less than eight processors, fill the memory board on the primary system board before installing memory modules on the secondary system board.
- Address Bit Permuting is a performance enhancing mode. It is supported for configurations with these restrictions: there must be a power of 2 number of rows; all rows must the same size; and all populated rows must be adjacent and start at row 0. BIOS does not permit Address Bit Permuting with illegal configurations.

  The table below shows the memory configurations that allow Address Bit Permuting (ABP):

Memory Size (MB)	DIMM J1-J4 (Banks 1 & 2)	DIMM J5-J8 (Banks 3 & 4)	DIMM J9-J12 (Banks 5 & 6)	DIMM J13-16 (Banks 7 & 8)	ABP Allowed?
512	32	32	32	32	Yes
2048	128	128	128	128	Yes
4096	256	256	256	256	Yes

LST SIMM Module

System memory data coherency is maintained using a Line Status Table (LST) SIMM. LST SIMMs are 68-pin static RAM (SRAM) memory modules with an access time of 15 ns. An LST SIMM is installed on the primary or secondary system board whenever a memory board is resident.

Use a 256K LST SIMM when:

- the memory configuration is equal to or less than 256 MB.

Install a 1024K LST SIMM when:

- the memory configuration is larger than 256 MB.
- you use 200 MHz/1 MB cache processors.

Add-In Board Slots

CAUTION: Electrical damage to the system board results if a PCI adapter is inserted into an EISA connector and the system is powered up.

The primary system board has the following add-in board slots:

- four EISA bus slots for add-in boards. The EISA bus is an extension of the Industry Standard Architecture (ISA) bus. Because EISA is fully backward-compatible with ISA, you can install old or new ISA add-in boards in your server.
- seven PCI (Peripheral Component Interconnect) bus slots for add-in boards.

Note: The top EISA slot and the bottom PCI slot on the primary system board share an external add-in board slot. You may install either a PCI or an EISA/ISA adapter in these slots.

The secondary system board contains eight dedicated PCI slots.

The add-in boards are connected to system via the PCI subsystem, which consists of four I/O bus segments as follows:

- PCI Bus #0 is the primary (compatibility) bus; it connects the processor bus to a PCI/EISA bridge and four PCI connectors (P1, P2, P3, P7) on the primary system board.
- PCI Bus #1 connects the processor bus to two embedded fast/wide SCSI controllers (A and B) and three PCI connectors (P4, P5, P6) on the primary system board.
- PCI Bus #2 connects the processor bus to one embedded fast/wide SCSI controller (C) and four PCI connectors (P8, P9, P10, P11) on the secondary system board.
- PCI Bus #3 connects the bus to four PCI connectors (P12, P13, P14, P15) on the secondary system board.

As a guideline for best performance, PCI slots can be populated top to bottom in alternating busses. In a dual system board configuration, add cards in slot order P1, P4, P8, P12, P2, P5, P9, P13, P3, P6, P10, P14, P7, P11, P15.

As a requirement, EISA slots on the primary system board are populated starting from the bottom.

See the configuration restrictions below for more information on populating PCI and EISA slots.

Configuration Restrictions for Add-in Boards

Following are the configuration restrictions for add-in boards:

Type of Adapter or Device Affected	Configuration Restriction
FDDI	Install a maximum of 8 FDDI adapters of any kind on your system.
Single channel SCSI	Maximum number allowed in a system: 4 Adaptec 2940UW adapters or one 2944UW adapter
RAID Controller PCI adapter	Must be installed in the first connector of PCI Bus #1. Maximum number allowed in a system: 4.
Mylex SCSI controller cards	Only four Mylex adapters may be installed in a system. The first Mylex adapter must be installed in slot P4. Remaining adapters may be populated in either PCI Bus #1 (slots P5, P6) or PCI Bus #2 (slots P8, P9, P10, P11). Do not mix different versions of the Mylex Raid controllers within a system. A SIMM memory module must be installed on the Mylex card to enable it to work properly. Consult adapter documentation for more information.
PCI Ethernet	Begin installing in PCI Bus #0. Maximum number allowed: 4.
PCI SCSI adapter	Begin installing in PCI Bus #1.
Token Ring	Maximum number allowed in a system: 4
VGA adapters	Must be installed in PCI Bus #0.

Note: For SCSI devices which are non-boot, you must disable its BIOS. At the BIOS Setup main screen, select Advanced>PCI Configuration and select the applicable SCSI device submenu. Select Option ROM Scan>Disabled. For more information on the BIOS Setup Utility, refer to Chapter 4 of the *DIGITAL Server 9100 Series System Software Guide.*

Other Considerations for Add-in Boards

- When a video controller adapter is present in any of the PCI Bus 0 or EISA slots, then the video monitor cable to the onboard VGA controller must be detached and connected to the video controller adapter.
- If at all possible, it is recommended that you not move SCSI adapters to different physical slots after the system has been in normal operation. Moving adapters affects the BIOS scan order and the operating system device ID assignment.
- The cards should be populated in the following order by type: bridged SCSI cards, non-bridged SCSI cards, bridged networking cards, non-bridged networking cards, all other cards.
- In cases of high EISA or VGA activity, improved performance may be gained by populating PCI slots beginning in Bus #1.
- For redundant high-availibility (that is, providing two physically separate paths to a multi-ported disk array) configurations, it may improve performance and availability to put redundant boards on different PCI busses.
- For systems using the Windows NT® operating system, when NT Disk Administrator is run to place “signatures” on the drives, the virtual device information (drive letter) for a drive (or partition) is written to the device, and remains with it if devices are moved or inserted. If Disk Administrator is not run, then all virtual device assignments will change whenever a device is added or moved. The NT Disk Administrator should always be run to minimize configuration problems.

SCSI Controllers

The primary system board includes two embedded Ultra SCSI-2 controllers (Adaptec™ AIC-7880), Channels A and B integrated as PCI bus masters. The secondary system board has one embedded SCSI-2 controller (Channel C).

The controllers support data path widths of:

- 8-bits (fast SCSI) at a data transfer rate of 10 MB/sec
- 16-bit (fast/wide SCSI) at a data transfer rate of 20 MB/sec
- 16-bit (ultra SCSI) at a data transfer rate of 40 MB/sec.

As PCI bus masters, these controllers support burst data transfer rates up to the maximum of 133 MB/sec.

Each SCSI drive backplane is configured as one SCSI bus. The SCSI backplane automatically terminates the full 16-bit-wide bus.

External Primary System Board Connectors

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. You can specify (through the BIOS Setup Utility) that the system be locked automatically if there is no keyboard or mouse activity for a predefined length of time. Once the inactivity timer has expired, the keyboard or mouse does not respond until you enter the password stored previously through BIOS Setup.

Video

The video controller on the primary system board is a Cirrus Logic CL-GD5429 super VGA controller (ISA) and is fully compatible with these video standards:

- CGA
- EGA
- Hercules Graphics
- MDA
- VGA

The standard system configuration comes with 1 MB of onboard 70 ns video memory. The super VGA controller supports only analog monitors (single and multiple frequency, noninterlaced) with a maximum vertical retrace non-interlaced frequency of 75 Hz.

With 1 MB memory, the video controller supports 132-column text modes and high resolution graphics with up to 1280 x 1024 x 16 colors. Depending on the environment, the controller displays up to 64,000 colors in some video resolutions.

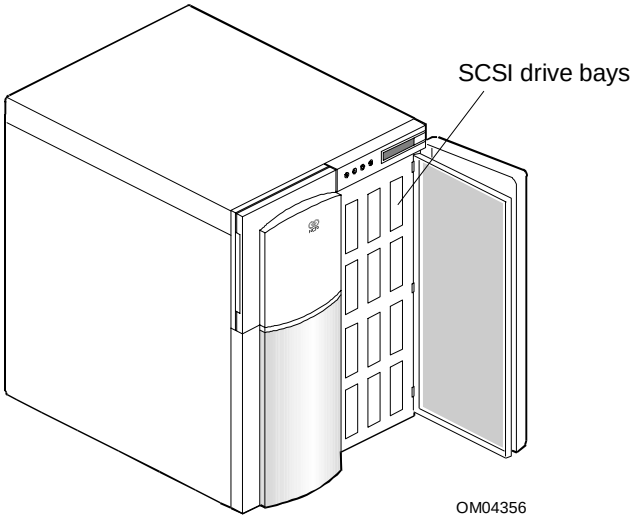
Note: A VGA video controller adapter must be installed in a PCI Bus 0 or EISA slot. When this adapter is installed, the onboard VGA controller is disabled and the video controller adapter must be attached to the display.

Peripherals

SCSI-2 Hard Drive Bays

The following figure shows the location of the SCSI-2 SCA hard drive bays.

12 Bays for SCSI Drives (EMI Door and Exterior Door Shown Open)



The right side of the system contains 12 bays for 3.5-inch SCSI-2 SCA hard drives and two hot-swap backplanes. Each backplane supports six drives. The backplanes require an 80-pin SCA connector on the drives you install.

A drive carrier is required as part of the hot-swap implementation. Each carrier can accommodate a 3.5-inch peripheral between 1.0 and 1.6 inches high. A drive is mounted in the carrier with four fasteners, and the carrier is retained in the chassis by a locking handle.

The hot-swap bays are designed to accept peripherals that consume up to 15 watts of power and run at a maximum ambient temperature of 50ºC.

A fault light on the front panel control board gives the general indication that there has been a fault on a hot-swap drive. Each SCSI drive has a set of three lights to indicate the fault or other status:

- Power-On (green LED)
- Active (green LED)
- Fault (yellow LED)

See “SCSI Drive Status LED Descriptions” earlier in this chapter for more detailed information.

SCSI Drive Hot-Swap Backplane

The SCSI backplane is an integral part of the chassis. Each backplane provides control signals for six SCSI peripheral devices. Two backplanes can be used to support a maximum of 12 devices.

The upper SCSI backplane receives control signals from a wide/fast SCSI-2 controller on the primary system board. The lower SCSI backplane receives control signals from an add-in SCSI controller module or from the SCSI-C controller in a dual system board configuration.

The backplane has two main functions:

- SCSI drive control
- System data logging

Drive status is monitored to detect failing drives and to control LED indicators. Critical event data and drive status is reported over the I^2C bus and logged for server management software to interpret.

The hot-swap backplane features include the following:

- Insertion and removal of hard drives while power is on (referred to as “hot-swap”)
- Simplified cable management
- SCA connectors to simplify inserting and removing hard drives
- Jumper selection for SCSI ID change
- Power control for each hard drive
- SCSI management of RAID fault LEDs and power supply status

Each backplane supports SCSI drives with SCA connectors.

Onboard SCSI Channel A controls the upper SCSI hot-swap backplane. Onboard SCSI Channel B controls the removable media devices. The lower SCSI backplane is controlled by a separate add-in SCSI controller module or the onboard SCSI Channel C.

Ultra SCSI Drive Considerations

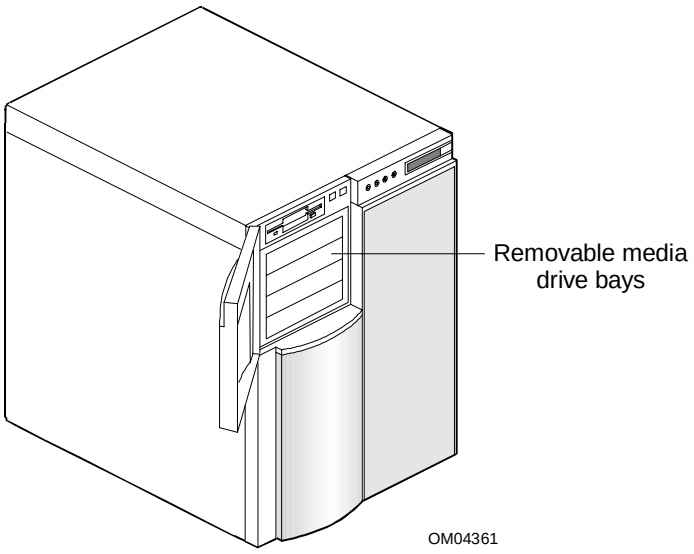
The DIGITAL Server 9100 uses only Ultra SCSI drives. Depending on the type of controller, enable the appropriate option (see the following table) for each SCSI channel that connects to the backplane.

If the controller is…	Then enable this option for Ultra SCSI support…
Onboard SCSI channel A, B, or C or an add-in Adaptec controller	"Support for Ultra SCSI Speed" through the Adaptec SCSI*Select* Utility
Mylex RAID	"40MHz" through the DACCFG Utility (Advanced Functions menu)

Removable Media Drive Bays

The server contains four bays for removable media drives plus a factory-installed 3.5-inch diskette drive. The following figure shows the location of the removable media drive bays.

Removable Media Drive Bays (Exterior Door Shown Open)



On the left side of the system at the top, a built-in bay contains a 3.5-inch diskette drive that supports both 720 KB and 1.44 MB media.

Below the diskette drive, four 5.25-inch half-height bays are available for peripherals with removable media (diskette, CD-ROM, tape cartridge). Any two adjacent 5.25-inch bays can be converted to a single full-height bay. The 5.25-inch drives can be removed directly from the front of the chassis after the 5.25-inch plastic frame is removed.

The front bezel is retained by snap features and is accessible when the side panel is removed. Cosmetic filler panels and metal EMI shields are installed over all unused 5.25-inch bays.

CAUTION: Do not put hard drives in the 5.25-inch half-height bays due to the EMI generated by hard drives and the increased susceptibility to electrostatic discharge.

Power System

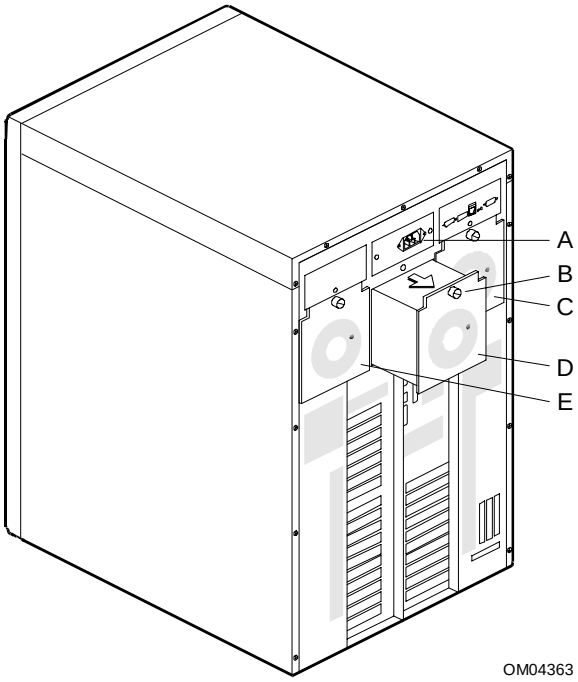
The power system consists of the following:

- Power supplies
- Interlock circuit
- Power distribution backplane

Power Supplies

The system may be configured with two or three 625-watt, hot-swappable power supplies. The following figure shows the location of power supplies. In a dual system board configuration with three power supplies, each supply automatically switches between the following voltage range: 100-120 Vac at 50/60Hz, 12 A maximum current or 200-240 Vac at 50/60 Hz, 10 A maximum current.

Location of Power Supplies



A	AC input module
B	Thumbscrew
C	Hot-swappable power supply 3
D	Hot-swappable power supply 2
E	Hot-swappable power supply 1

Each power supply provides these DC outputs:

- +5.1 V
- +12 V
- +3.3 V
- -5 V
- -12 V
- +5.0 V aux

The +5.0 V aux output is present when AC power is present.

All output grounds connect to the power supply chassis and to earth ground through the AC line cord.

Each power supply has the following features:

- Packaged as a plug-in module and is hot-swappable
- A 120 mm cooling fan integrated within each power supply enclosure. (The fan circuitry implements variable speed fan control and fan failure detection.)
- Built-in thermal protection if air flow through the power supply is reduced sufficiently to cause damage
- Built-in over-voltage and over-current protection
- Automatic recovery after an AC power failure without intervention by an operator or a server management board (If AC power is interrupted while the system is on, the system is powered-on when AC power is restored; if AC power is interrupted while the system is off, the system remains off when AC power is restored.)

IMPORTANT: If you open a power supply for any reason, your system warranty is voided.

Number of Power Supplies in a Configuration

In a system with more than one supply, power is drawn equally from all supplies present (from one to three). A system with two power supplies can be fully loaded (all drive bays and add-in board slots filled).

Two (or three) supplies use a forced current-sharing technique that ensures that the supplies share within 10% at full load. In a high-access system with three power supplies, the third supply gives redundancy, because the load is redistributed if one supply fails.

Interlock Circuit

The system contains an interlock circuit. Removal of either side panel activates the interlock circuit and disables the DC outputs. Opening the EMI door covering the hard drive bay activates the interlock circuit and logs an event in the BIOS Event Log; power is not disabled.

CAUTION: The interlock circuit does not remove AC power from the system. To remove AC power from the system, you must unplug the AC power cord.

For additional information on locations and descriptions of interlock circuits, refer to “System Security Features” later in this chapter.

Power Distribution Backplane

Each power supply docks into a power distribution backplane inside the chassis. The backplane provides connections for the following:

- DC power (for system boards, fans, SCSI backplane, and removable media drives)
- Signals
- Status and control functions – such as server management features (quantity, location, and reporting of installed and failed supplies) – through I^2C control

The system can sense an over-voltage condition on the +3.3 Vdc, +12 Vdc, and +5.1 Vdc outputs for each supply. If the system senses an over-voltage condition, the power supply shuts down and latches off until you press the front panel power on/off switch (for several seconds) and then press again to restart.

Controlling Access to Power On/Off

The system DC power can be turned on or off as summarized in the following table. The different methods provide flexibility in controlling how and by whom the system can be powered on or off.

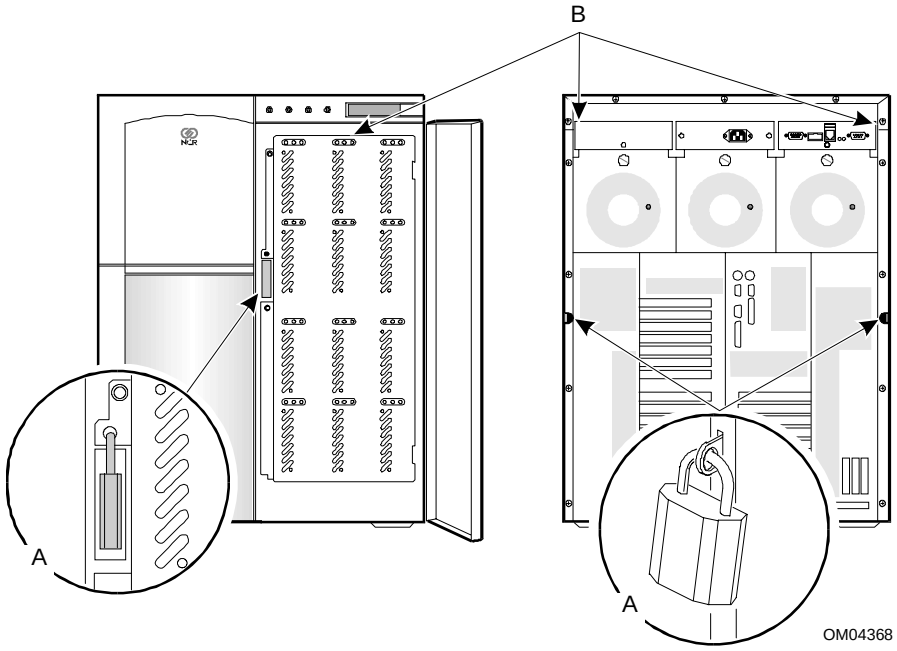
Power On/Off by Using:	Description
Front panel power on/off switch	Pressing the on/off switch is the most common method of turning system power on or off. This switch can initiate power-on at any time; powering-on in this manner is never blocked by any other system function. When the system is on, pressing and releasing this switch initiates power-off. However, secure mode prevents turning off the system power by using this switch.
Real-time clock/calendar (RTC)	RTC power control can be used by the BIOS or a utility program to power the system on or off at a predetermined time set in the RTC. Server management software can also use the RTC to power off the system automatically if an over-temperature or over-voltage condition occurs.

WARNING: The DC push-button on/off switch (a convex button) on the front panel does not turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet.

System Security Features

The following figure shows the intrusion protection features of the system.

Location of Server Security Features



Item	Description	Comment
A	Padlock loops	Secure the side covers by using padlocks (not provided). The top cover cannot be removed until the side covers have been removed. You can also secure the large front bay door with a padlock.
B	Location of three internal intrusion alarm switches	Intrusion alarm switches are present on the metal EMI door covering the SCSI drive bays and at the back of the chassis. The relays close when the side doors or EMI door are opened. An intrusion alarm signal is transmitted to the primary system board, where server management software processes the signal. If a side cover is removed, an interlock switch shuts the power supplies off following transmission of the alarm signal to the primary system board. If the EMI door is opened, an event is logged in the BIOS Event Log. Refer to the “Interlock Circuit” section earlier in this chapter.
–	Environmental sensors (not shown)	The system contains sensors to monitor temperature, voltage, and fan failure.

The following sections describe the software security features of the System Configuration Utility (SCU) and the BIOS Setup Utility. For additional information, refer to the “Security” chapter of this book.

Software Locks via the System Configuration Utility (SCU)

The SCU has software features that let you control access to one or more parts of the system in the following ways:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period—1 to 120 minutes
- Set and enable an administrative password
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches
- Activate a hot-key combination to enter secure mode quickly
- Disable writing to the diskette drive when secure mode is set

Software Locks via the BIOS Setup Utility

The BIOS Setup Utility has software features that let you control access to one or more parts of the system in the following ways:

- Enable the secure mode timer option so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period—1 to 120 minutes
- Set and enable an administrative password
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches
- Disable the power switch and reset button in secure mode
- Set a hot-key combination to enter secure mode quickly
- Disable writing to or booting from the diskette drive when secure mode is set
- Require user to enter password to boot server
- Specify boot sequence; if you boot when system is in secure mode, user must enter a password.

Using Passwords

User and administrative passwords are used to control access to the system, and to the System Configuration Utility (SCU) and BIOS Setup Utility. A user password, if defined, is required to boot the server. An administrative password, if defined, is required to make changes with the BIOS Setup Utility or SCU.

There is one exception to the requirement for entering a user password to boot the server. If secure mode boot is defined, the server can boot from the hard drive, but the keyboard is locked (all keyboard input is disabled) until you enter the user password.

Refer to the "Security Settings and System Boot" section in Chapter 3 in the *DIGITAL Server 9100 Series System Software Guide* for additional information about security and password processing.

Secure Mode

You can use the SCU or BIOS Setup to enable and configure the secure mode boot. When secure mode is in effect, note the following:

- You can boot the system to get the operating system running, but you must enter the user password to use the keyboard or mouse.
- You cannot power-off or reset the system with the front panel switches.

Secure mode has no effect on functions enabled via the server management board or power control via the real-time clock/calendar.

Taking the system out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system does not power-off when secure mode is later removed. However, if the front panel power on/off switch remains depressed when secure mode is removed, power-off occurs.

Note: For additional information on server security features, see the "System Security" chapter.

Service Philosophy

The fixed disk drives, all removable media drives (diskette drives, CD-ROM drives, tape drives), and the power supplies are field replaceable units (FRUs). FRUs are composite units. The service philosophy is to replace and return each FRU as a complete unit. In the case of drives, the composite FRU consists of a drive attached to a chassis, with the appropriate adapter boards, power assemblies, and wire assemblies.

Fixed disk drives and power supplies are designed to be easily replaceable while the system is operating. This results in an easily serviceable subsystem with very high fault tolerance.

WARNING: The only components you can hot-swap (replace with the power on) are the SCSI drives and power supplies. Do not attempt to add or remove any of the other components unless you unplug the AC power cord.

Regulatory Statements and Warranty

This section contains the following:

- Safety certifications
- Emission/immunity certifications
- Warranty

Safety Certifications

The server is in compliance with the following safety certifications.

Country	Safety Certification
USA	UL 1950
Canada	CSA C22.2 No. 950-M95
Europe	EC Directive 73/23/EEC
CE Mark	TUV - EN60950
Mexico	NOM-019-SCFI-1993
Australia/New Zealand	AS/NZS 3260 (IEC 950)
Russia	GOST-R (IEC 950)

Emission/Immunity Certifications

The server is in compliance with the following emission/immunity certifications.

Country	Emission/ Immunity Certification	Declaration
USA	FCC CFR 47 - Part 15 - Class A	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his own expense.
Canada	CSA C108.8-M1983	This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of Canada. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radio-électrique édicté par le ministère des Communications du Canada.

Country	Emission/ Immunity Certification	Declaration
Europe	EMC Directive 89/336/EEC	
CE Mark	EN 55022 - A	CISPR 22 Class A Conducted CISPR 22 Class A Radiated
	EN 50082 - 1	IEC 801-2 Electrostatic Discharge IEC 801-3 RF Electromagnetic IEC 801-4 Immunity Signal/Control Ports IEC 801-4 Immunity AC Power Ports
Japan	VCCI - Class 1	This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read instructions for correct handling.
		この装置は，第一種情報処理装置(商工業地域において使用されるべき情報処理装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。 従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。 取扱説明書に従って正しい取り扱いをして下さい。
Australia	AS/NZS 3548 (CISPR 22-A)	
New Zealand	RFS 49 - 1989 (CISPR 22-A)	

NOTICE: Vendor is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by vendor. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user.

Warranty

Warranty information for your server can be obtained from the *Warranty and Service Information* booklet provided with your server.

Chapter 2

Installing and Removing System Components

This chapter describes how to install and remove system components that you can access without removing the covers. It includes the following procedures:

- Installing or swapping a SCSI drive in a hot-swap bay
- Removing and installing power supplies

Terms, Conventions, and Related Documents

Refer to the “Preface” of this document for important information on how to use this book, terms and conventions, and related documents.

When used in this chapter, the term “configuration utility” refers to the System Configuration Utility (SCU). The “Configuring Your Server” section of Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide* discusses how to use the SCU in detail.

Tools and Supplies Needed

You need the following tools and supplies to perform the procedures described in this chapter:

- Phillips #1 and #2 screwdrivers
- Hexagonal-head nut driver
- Standard tip screwdriver
- Antistatic wrist strap and conductive foam pad (recommended)

Warnings and Cautions

The following warnings and cautions apply throughout this chapter. Only a technically qualified person should integrate and configure the server.

Warnings

System power on/off: The DC push-button on/off switch (a convex button) on the front panel DOES NOT turn off the system AC power. To remove power from the server, you must unplug the AC power cord.

Hazardous conditions, power supply: Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.

Hazardous conditions, power distribution backplane: Hazardous energy levels are present behind the protective cover over the power distribution backplane. There are no user-serviceable parts; servicing should be done by technically qualified personnel.

Cautions

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other server parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to a chassis ground—any unpainted metal surface—on your server when handling parts.

Installing or Swapping a SCSI Drive in a Hot-Swap Bay

This section describes the procedure for installing a new drive in or swapping out a faulty drive from one of the 12 hot-swap drive bays. The 3.5-inch SCSI drives must use the industry standard 80-pin Single Connector Attachment (SCA) connector. Each drive must be installed in a carrier (supplied).

If you are installing new drives, follow an installation scheme starting with the top left drive. Fill the bays left to right, across a row, and then move down a row.

If an individual SCSI drive fault LED (yellow light) is on steadily, this indicates that the drive below it has been flagged as faulty by the SCSI host controller. Follow the procedure described in this section to remove the faulty drive and swap in a good one.

Electrostatic Discharge (ESD) and Protection

ESD can damage disk drives, boards, and other parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you do this procedure at an ESD workstation or provide some ESD protection by wearing an antistatic wrist strap attached to a chassis ground—any unpainted metal surface—on your server when handling parts.

No Need to Turn Off Power

You can install or swap SCSI drives without turning off power. This is one of the few system procedures that is safe to do with the system power left on.

WARNING: This capability is true only for the drive/carrier assemblies in the hot-swap bays, not for drives in any other drive bays.

When to Replace Drive

Wait until the drive spins down before you replace the drive. When the SCSI drive fault LED indicates a drive fault (steady yellow light), you can remove the drive and swap in a replacement at any time when the drive is not being accessed, without needing to power down the server. However, drive manufacturers caution against moving a drive that is still spinning because of possible damage to the spindles.

Status LEDs

If you are swapping out a faulty SCSI drive, you can pinpoint which drive to remove by checking the status LEDs that occur in sets of three above each of the 12 drive bays.

The following table shows SCSI drive status LED descriptions.

SCSI Drive Present, Power On Green LED	SCSI Drive Active Green LED	SCSI Drive Faulty* Yellow LED	Description and Action If Needed
◎ On	○ Off	○ Off	Drive is present with power.
◎ On	✳ Blinking	○ Off	Drive is present with power and is being accessed.
○ Off	○ Off	◎ On	Drive CAN be replaced. Steady yellow fault light indicates drive has a problem. Power to drive is off.
◎ On	○ Off	✳ Slow blinking	Drive SHOULD NOT be replaced at this time. A slowly blinking yellow fault light indicates a drive that has just been replaced is in recovery mode (drive array being rebuilt). Power to drive is on.
○ Off	○ Off	○ Off	There is no drive installed in the bay.

* Table assumes a SCSI host controller is installed to send SAF-TE control signals to the drive fault LED.

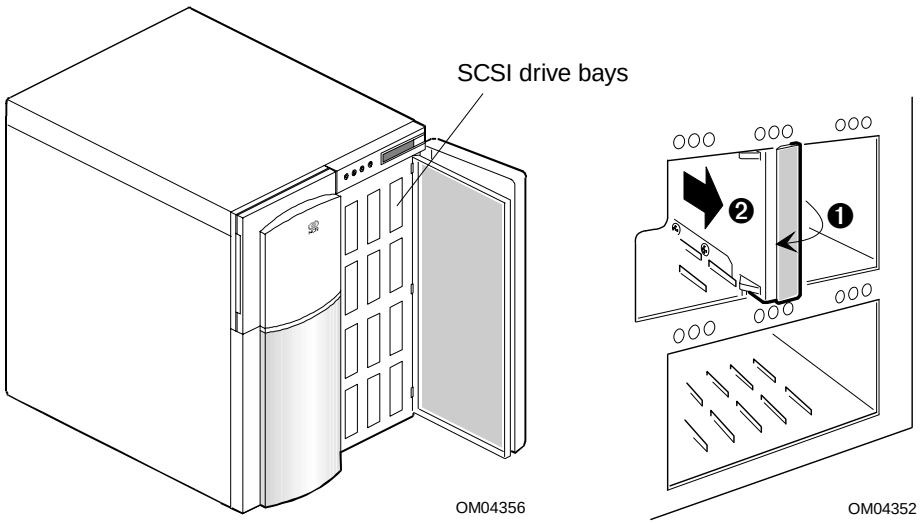
Note: The DIGITAL Server 9100 series utilizes a Fault Reporting mechanism called SAF-TE (SCSI Accessed Fault Tolerant Enclosure) for reporting hot-swap disk drive activity and status. All other DIGITAL Servers as well as external Expansion Cabinets use the DIGITAL Fault-Bus for reporting of hot-swap disk drive activity and status. The Mylex RAID controllers provide support for both types of fault reporting and are shipped configured for SAF-TE when factory installed or Digital Fault-Bus when ordered as standalone options. A RAID controller can be configured for SAF-TE or Fault-Bus **but not both**. Consequently, a RAID controller configuration with one channel connected to internal hot-swap disk drives (SAF-TE) and another channel connected to an expansion cabinet (Fault-Bus) is not supported.

Installing or Swapping a Drive

After you determine which drive is faulty, the procedure is the same to swap a drive or to install one for the first time. To perform the procedure, refer to the following figure and follow these steps:

1. Observe the ESD caution and the notes listed at the beginning of this section.
2. Open the right front bezel door.

Removing the Drive from the Bay



3. Open the metal EMI door in accordance with instructions in Chapter 1.
4. If you are removing a faulty drive, first check the LEDs to confirm which drive to remove. To remove the faulty drive from the bay, grasp the plastic lever, and pull the lever toward you. See the figure "Removing the Drive from the Bay" above.
5. Remove your new drive from its protective wrapper.
6. Align drive/carrier assembly so it engages the guide rails in the bay.
7. Gently push the assembly into the bay until the drive docks with the backplane connector.
8. Push the plastic lever to the right until it locks around the small metal posts.
9. Close the metal EMI door, and secure with three thumbscrews.
10. Close the front bezel door.

Removing and Installing Power Supplies

The power supplies are hot-swappable. You do not need to remove AC power before removing or installing a power supply.

However, if you remove a power supply with the power on, the server must have a redundant power supply configuration. In this server system, three power supplies are required for N+1 redundancy. Otherwise, an overload condition might occur and cause the server to shut down.

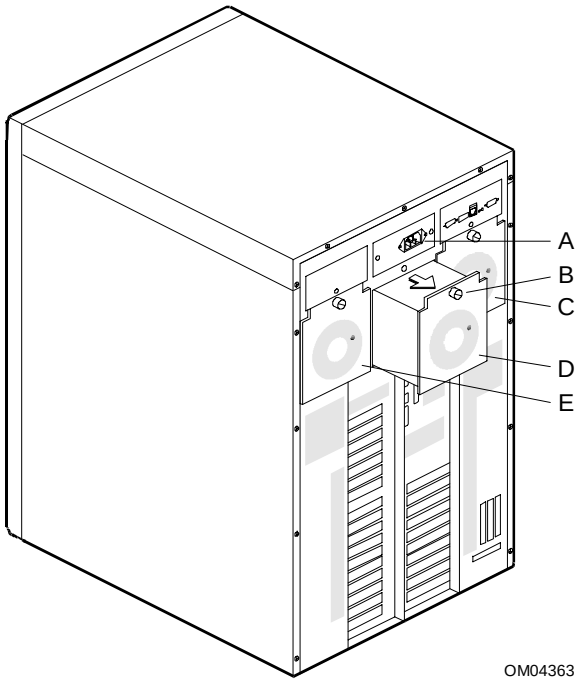
CAUTION: Use only hand tools when inserting or removing a power supply. Do not use power tools.

Removing a Power Supply

The following figure shows the power supply modules. To remove a power supply:

1. Observe the safety and ESD precautions listed at the beginning of this chapter.
2. Disengage the power supply using the thumbscrew.
3. Carefully slide the power supply out of the chassis.

Power Supply Modules



A	AC input module
B	Thumbscrew
C	Hot-swappable power supply 3
D	Hot-swappable power supply 2
E	Hot-swappable power supply 1

Installing a Power Supply

To install a power supply:

1. Observe the safety and ESD precautions listed at the beginning of this chapter.
2. Slide the new or replacement power supply into the chassis.
3. Turn the thumbscrew to engage the power supply with the server.

Chapter 3

System Security

This chapter discusses the following security features:

- Cabinet security features
- BIOS and configuration utility security features

Terms, Conventions, and Related Documents

Refer to the “Preface” of this document for important information on how to use this book, terms and conventions, and related documents.

When used in this chapter, the term “configuration utility” refers to the System Configuration Utility (SCU). The “Configuring Your Server” section of Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide* discusses how to use the SCU in detail. The BIOS Setup Utility is discussed in Chapter 4 of the *DIGITAL Server 9100 Series System Software Guide.*

Cabinet Security Features

The following table shows the server cabinet mechanical security features:

Security Feature	Description
Metal padlock loops	There is a padlock loop at the back of each side panel to enable you to lock the side covers. The top cover cannot be removed until the side covers have been removed.
Intrusion alarm switches	Intrusion alarm switches are located on each side panel. If someone removes the side cover, an interlock switch sends a signal to the system board and the server shuts off the power supplies.

BIOS and Configuration Utility Security Features

The BIOS and the configuration utility provide a number of security features to prevent unauthorized or accidental access to the server. Once you enable the security measures, access to the system is allowed only after you enter the correct password(s). The following table lists the features, describes what protection each offers, and tells how to enable or disable each feature.

Enabling Security Features

In general, to enable or set the features listed in the following table, you may use either the configuration utility or the BIOS Setup Utility. If you use the SCU, most features (unless otherwise noted) are accessed by choosing "Step 3: Change Configuration Settings," selecting System Board, and scrolling to Security Subsystem Group. If you use BIOS Setup, all features reside in the Security menu.

IMPORTANT: A user password must be set for security functions to activate.

Information on accessing BIOS and SCU is covered in the *DIGITAL Server 9100 Series System Software Guide.*

Feature	Description
Put the system into secure mode boot	When secure mode boot is enabled, the server can boot and run the operating system, but does not accept mouse or keyboard input until you enter the user password. In secure mode boot, if the system detects a diskette in the A: drive at boot time, the system prompts for the password. When you enter the password, the server boots from the diskette and is no longer in secure mode. If there is no diskette in the A: drive, the server boots from the C: drive and is automatically in the secure mode. All of the secure mode features that are enabled go into effect at boot time. **BIOS Setup:** To put the system into secure mode, go to the Security menu: • Create a new password using the "Set User Password" menu option. • Enable the "Secure Mode Boot" option. **SCU:** Set a user password and enable "Secure Mode Boot" option.
Enter secure mode immediately with hot keys	To secure the system immediately, rather than wait for the inactivity time-out period to expire, use a hot-key combination that you set. **BIOS Setup:** Use "Secure Mode Hot Key" option. **SCU:** Set using "Hot Key" option.
Lockout timer: keyboard/mouse lock and blank video	When the security features below are set in either BIOS Setup or the configuration utility, and there is no keyboard or mouse action for the specified time-out period, the monitor display goes blank and the keyboard is locked. Keyboard LEDs flash to signal that user must enter password. To resume activity, type your user password. **BIOS Setup:** Set time-out options under "Secure Mode Timer" and enable "Video Blanking." **SCU:** Set inactivity period setting under "Lockout Timer" and enable "Video Blanking."

Feature	Description
Lock the reset button and power switch	The power switch and reset button are disabled when the system is in secure mode. **BIOS Setup:** Enable “Front Panel” option. **SCU:** Enable “Secure Front Panel” option.
Disable writing to diskette	If the system is in secure mode, it does not boot from or write to a diskette unless you enter a password. To write-protect floppy drive when secure mode activates: **BIOS Setup:** Enable the “Floppy Write Protect” option. You can also control access to the diskette drives by setting “Diskette Access” to User or Administrator. **SCU:** Enable “Floppy Write Protect” option.
Require password on boot	System requires user or administrator password to boot server. **BIOS Setup:** Enable “Password on Boot.” **SCU:** Feature not available.
Specify the boot sequence	System boots according to boot sequence specified. **BIOS Setup:** Main menu⇒Boot Sequence option: “A: then C:” – Boots from diskette drive A, or if no diskette is present, boots from hard disk C. “C: then A:” – Boots from hard disk C, or if no bootable operating system is present on disk C, boots from diskette drive A. “C: only” – Boots from hard disk C only. If you boot when the system is in secure mode, you must enter a user password. **SCU:** Feature not available.
Control access to using the SCU: set administrator password	To control access to setting or changing the system configuration, set an administrator password and enable it through BIOS Setup or the SCU. If you enable both the administrator and user passwords, either can be used to boot the server. Only the user password can be used to enable the keyboard and/or mouse. Only the administrator password allows you to change Setup and the SCU. **BIOS Setup:** Select “Set Administrator Password” in the Security menu. **SCU:** Select the “Administrative Password Option.”
Control access to the system other than SCU: set user password	To control access to using the system, set a user password and enable it through BIOS Setup or the SCU. **BIOS Setup:** Select “Set User Password.” **SCU:** Select “User Password Option.”
Boot without keyboard	There is no entry in BIOS Setup or SCU to enable or disable a keyboard. System boots whether a keyboard is installed or not. POST automatically detects the presence of a keyboard, and tests the keyboard if one is present.

Chapter 4

Troubleshooting

This chapter provides assistance in troubleshooting commonly reported problems with your server. It contains the following:

- Identification and description of BIOS codes and error messages
- Descriptions of problems you might experience and possible solutions

Terms, Conventions, and Related Documents

Refer to the “Preface” of this document for important information on how to use this book, terms and conventions, and related documents.

When used in this chapter, the term “configuration utility” refers to the System Configuration Utility (SCU). The “Configuring Your Server” section of Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide* discusses how to use the SCU in detail.

Codes and Error Messages

Each time you turn on the server, the BIOS Power-On Self-Test (POST) checks the system board(s), processors, ECC memory module, keyboard, and most installed peripheral devices. Error conditions, failures, and other problem messages are indicated by the following methods:

- Logging of critical events
- POST terminal error beep codes
- POST error codes and messages

Logging of Critical Events

Critical events are events that result in the system being shut down to prevent catastrophic side effects from affecting other parts of the system. Event logging is a BIOS feature that logs critical and informational events to nonvolatile flash memory.

You can use the BIOS Event Log utility provided in the Diagnostic Partition and on the Platform CD-ROM to view the event log.

For more information on this feature, refer to Chapter 1, "Overview," in the *DIGITAL Server 9100 Series System Software Guide*.

POST Terminal Error Beep Codes

At system power-on, before the video adapter has been initialized, beep codes are used to inform you of errors. A terminal error is one which prevents the POST process from continuing. POST error codes are logged in nonvolatile flash memory and displayed on the console monitor and in the event log. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message displays.

The table below describes the error condition associated with each beep code.

Beep Count	Error Condition
1	Refresh failure
2	Parity cannot be reset
3	First 4 MB memory failure
4	Timer not operational
5	Processor failure
6	Keyboard controller gate A20 is off (v_mode)
7	Exception interrupt error
8	Display memory R/W error
9	ROM checksum error
10	Shutdown register R/W error

POST Error Codes and Messages

The BIOS indicates errors by displaying a POST error code and message on the screen. The user can also read these codes in the BIOS Event Log. The following table shows the POST error codes and messages:

Error Code	Error Code Description
Disk Errors are 2x0	
200	Disk Failed
Keyboard Errors are 2x1	
201	User Has Stuck Keyboard
211	Keyboard Failure
221	Keyboard Controller Failure
231	Keyboard is Locked
Video Errors are 2x2	
202	Video Error
Memory Errors are 2x3	
203	Base Memory Failure
213	Shadowing of Memory Failed
223	Extended Memory Failure
POS/Timeout Errors are 2x4	
204	POS/Timeout Errors
CMOS Errors are 2x5	
205	CMOS Battery Weak or Dead
215	CMOS Checksum Bad
Timer Errors are 2x6	
206	Timer Error
Real Time Clock Errors are 2x7	
207	RTC Error
Configuration Errors are 2x8	
208	Configuration Errors
218	Configuration of Memory Failed
NVRAM Errors are 2x9	
209	NVRAM Error
COP Errors are 2xa	
20a	Co-Processor Errors
Diskette Errors are 2xb	
20b	Diskette Drive A Error
21b	Diskette Drive B Error
22b	Incorrect Drive A Type – Run Setup
23b	Incorrect Drive B Type – Run Setup
Load Errors are 2xc	
20c	Load Errors

Error Code	Error Code Description
Cache Errors are 2xd	
20d	System Cache Failure – Cache Disabled
I/O Errors are 2xe	
20e	I/O Address Failure
21e	COM Ports Failure
22e	Line Printer Port Failure
23e	I/O Address Conflicts
24e	Unsupported I/O Address
25e	IRQ Errors
26e	IDE Failure
27e	FDD Failure
Other Errors are 2xf	
20f	CPU ID Error
21f	BIST Failure
22f	Boot Strap Processor Error
23f	Application Processor Error
24f	EISA CMOS Not Writeable
25f	DMA Test Failed
26f	Software NMI Failed
27f	Fail-Safe Timer NMI Failed

Problems and Solutions

The sections that follow help you to identify and solve problems that might occur while using your server. These sections include the following information:

- Resetting the system
- System reset checklist
- Running new application software
- After the system has been running correctly
- Additional troubleshooting procedures
- Running system diagnostics
- Specific problems and corrective actions

Resetting The System

The following sections discuss key combinations and buttons that you may use to reset your system.

CAUTION: When Windows NT Server is running, disk data is often stored in temporary buffers in memory before being written out to disk. If there is data in these buffers, resetting or powering off the system causes this data to be lost. Always perform an orderly shutdown, if possible, to avoid losing data.

Ctrl+Alt+Del

Pressing these keys reloads the operating system for NT servers. This process is called a “soft boot” reset.

Note: The soft boot process does not automatically reset a system running Windows NT Server. The soft boot process does offer you the opportunity to perform a shutdown or to log off from the system, as well as several other options.

Reset Button

Pushing the reset button located above the small front bezel door clears the system memory, restarts POST, and reloads the operating system.

Power On/Off

Turning the power off and on by pushing the DC push-button switch twice on the front panel has the same effect as pushing the reset button, except that power is halted to all peripherals. This process is called a “cold boot” reset.

System Reset Checklist

When problems occur during a system reset, check the following:

- Is AC power available at the wall outlet?
- Is the system power cord properly connected to the system and plugged into a NEMA 5-15R outlet for 100-120 VAC or a NEMA 6-15R outlet for 200-240 VAC? Refer to "Power Cord and Receptacle Options" in the *DIGITAL Server 9100 Series Site Preparation Guide* for more information.
- Did you press the DC power on/off push-button switch on the front panel to turn the server on (power-on light should be lit)?
- Are cabinet doors fully closed?
- Are all cables correctly connected and secured?
- Are there any conflicts between add-in boards–for example, two add-in boards sharing the same interrupt?

  In the case of ISA boards, it is necessary to add the boards manually, using your configuration utility to avoid resource conflicts with installed EISA and PCI boards. Refer to "Configuring Your Server" in Chapter 3 of *DIGITAL Server 9100 Series System Software Guide* for more information about adding ISA boards to your system.
- If the server has a hard disk drive, is it properly formatted or defined? Refer to your operating system documentation for additional information.
- Are the configuration settings made with the configuration utility correct? For information about your system configuration utility, see the "Configuring Your Server" section of Chapter 3 in the *DIGITAL Server 9100 Series System Software Guide.* Some configuration utility settings are set to certain values based on the operating environment being installed. Refer to the *DIGITAL Server 9100 Series Installation Guide* for your operating environment to determine the correct settings.
- Is the operating system properly loaded? Refer to the operating system documentation.
- Is an LST SIMM module installed? Whenever a memory board is resident, an LST SIMM module must also be resident or the system will not boot.

If these items are correct, but the problem recurs, refer to the "Additional Troubleshooting Procedures" section later in this chapter.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is usually not the cause of the error, especially if other software runs correctly.

New Software Checklist

If problems occur when running new application software, check the following:

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation for system hardware requirements.
- Is the software an authorized copy? If not, obtain one; unauthorized copies often do not work.
- If you are running the software from a diskette, is it a good copy? Does your operating system support running software from diskette?
- If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- Are the correct device drivers installed? Refer to operating system documentation.
- Is the software correctly configured for the system? Refer to operating system documentation.
- Are you using the software to application software documentation?

If the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure.

Equipment Failure Checklist

To check for equipment failure, check the following:

- If you are running the software from a diskette, try a new copy of the software. Does your operating system support running software from diskette? Can other software be run from this drive? If not, you might have a problem with your diskette drive.
- If you are running the software from a hard disk drive, try running it from the original installation media, if possible.
- If the problems are intermittent, there may be a loose cable, dirt or fluid in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. (Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.)

  Note: If you are receiving random errors in your data files, voltage spikes on your power line may be corrupting them. If you are experiencing any of the symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the server power cord.

If the problem recurs after you have checked and corrected all of the above items, refer to the "Additional Troubleshooting Procedures" section of this chapter.

If you receive any error messages, refer to the "Codes and Error Messages" section of this chapter for an explanation of the messages and suggested corrective actions.

Additional Troubleshooting Procedures

This section contains the following:

- Monitoring POST
- Confirming loading of the operating system

Monitoring POST

Each time you turn on the server, POST checks the system board(s), CPU modules, ECC memory modules, keyboard, and most installed peripheral devices. To monitor POST, refer to the following sequence that POST runs:

1. During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory installed on the ECC memory module, the memory test may take several minutes to complete.
2. After a soft boot (pressing CTRL+ALT+DEL), POST does not test the memory.

   The following message displays at the bottom of the screen:

   ```
   Press <F2> to enter SETUP
   ```

3. If you do not press F2, the message remains for a few seconds, and the boot process continues.
4. The following message displays:

   ```
   Press <Ctrl><A> for SCSISelect(TM) Utility!
   ```

5. Press CTRL+A if you need to configure SCSI devices in your server that are attached to one of the onboard Adaptec 7880 controllers. When the utility displays, follow the instructions on your monitor to configure the onboard SCSI AIC-7880 host adapter settings and run the SCSI disk utilities. See Chapter 5, “Configuring Adapters,” in the *DIGITAL Server 9100 Series System Software Guide*.
6. If you choose not to run the SCSI*Select* Utility, the boot process continues.
7. If the server halts before POST completes running, a beep code sounds, indicating a fatal system error that requires immediate attention. Note the screen display and write down any beep code emitted. (See the “Codes and Error Messages” section in this chapter for a list of beep codes.) This information is useful to your service representative.

   If the server does not halt, then it will beep twice when ready to boot and the monitor displays the following message:

   ```
   Press <D> to boot Diagnostic Partition
   Press <F1> for normal boot, <F2> for BIOS Setup
   Otherwise, <F1> is selected in 30 seconds
   ```

   Refer to the “Booting the Operating Environment” section in the *DIGITAL Server 9100 Series Site Preparation Guide* for additional information.

Confirming Loading of the Operating System

Once the server boots up, the operating system prompt displays on the screen. The prompt varies according to the operating system. Refer to your operating system documentation for additional information.

Running System Diagnostics

If your server does not boot or operate properly, you might need to run system diagnostics to determine the problem. This section describes some problem situations that might require you to run system diagnostics.

Definitions

You should be familiar with the following terms before reading the rest of this section:

Out-of-service diagnostics

Hardware-level diagnostics that require you to shut down your operating system before running them

In-service diagnostics

Diagnostics that you can run while your operating system is running

Running Out-of-Service Diagnostics

To run out-of-service diagnostics, you must boot to the Diagnostic Partition or the Platform CD-ROM. See the "Diagnostic Partition" section in Chapter 2 of the *DIGITAL Server 9100 Series System Software Guide* for information about accessing the Diagnostic Partition.

Following are some situations when you might want to run out-of-service diagnostics:

- The server fails to load and/or boot the operating system software when you turn on the power and select normal boot.
- The server fails to load and/or boot the operating system software after you add additional hardware such as more memory, processors, SCSI devices, or adapter cards.
- The operating system software "panics" or hangs repeatedly and you have **not** recently made changes to it such as a kernel patch, a new application which required a kernel rebuild, or a changed kernel tuning parameter value.

When Not To Run Out-of-Service Diagnostics

Following are some situations when you should **not** run out-of-service diagnostics:

- The operating system software panics and/or hangs repeatedly after you **have** made a change to it such as a kernel patch, a new application which required a kernel rebuild, or a changed kernel tuning parameter value.
- The server runs normally but one of the user applications fails to execute correctly.
- A device such as printer, tape, disk, modem, network adapter, or terminal fails to function properly but the server's operating system software is working. Run in-service diagnostics to test the failing device.

Additional Information

For additional information about running diagnostics on your server, see the *AMIDiag User's Guide* on the Quick Launch CD-ROM.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- Power light does not light
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- Cannot use keyboard or mouse
- Cannot boot from hard drive
- Cannot boot from CD-ROM
- BIOS corrupted during system BIOS upgrade
- Problems with application software

Try the solutions provided in the following sections in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for assistance.

For more detailed information on activity lights mentioned throughout this chapter, refer to “Chassis Front Features and Controls” in Chapter 1.

Power Light Does Not Light

When the power-on light located on the front of the chassis is not lit, check the following:

- Did the server boot normally? If so, the power LED may be defective.

If the server is not running, check the following:

- Is AC power available at the wall outlet?
- Is the system power cord properly connected to the server and the wall outlet?
- If there is a fuse in the system AC power cord plug, does the fuse still conduct electricity?
- Did you press the power on/off push-button switch?

If all items are correct and problems persist, contact your service representative or authorized dealer for assistance.

No Characters Appear on Screen

When your video monitor screen is blank, check the following:

- If you are using an add-in video controller, ensure that the monitor is plugged into the add-in controller and not the onboard video controller.
- Is the video monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Are keyboard LEDs flashing? If so, type your user password and press ENTER.

Note: Refer to the video monitor documentation from the manufacturer for correct procedures.

If you cannot correct the problem, the video display monitor or video controller may have failed. If possible, try connecting a working video display to your server. If this still fails, contact your service representative or authorized dealer for assistance.

Characters Are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video monitor? Refer to the video monitor documentation from the manufacturer.
- Is the video monitor cable properly installed?

If the problem persists, the video monitor may be faulty or the monitor may be the incorrect type. Contact your service representative or authorized dealer for assistance.

Cannot Use Keyboard or Mouse

If the BIOS Setup option “Secure Mode Boot” is enabled, the system boots in secure mode and you must enter a password to unlock the keyboard. If the server is running Windows NT Server, two situations can occur where it might become impossible to use the keyboard or mouse:

BIOS Setup Options	Situation That Causes a Problem
Secure Mode Boot is enabled and Password on Boot is disabled.	If you boot the server and do not unlock the keyboard before Windows NT Server detects devices at the blue screen, then the keyboard and mouse are not detected. When Windows NT Server loads, you cannot access the system through the keyboard or mouse.
Secure Mode Timer is set to too short an interval (1 to 5 minutes).	If you boot the server and keyboard lockout occurs before Windows NT Server detects devices at the blue screen, then the keyboard and mouse are not detected. When Windows NT Server loads, you cannot access the system through the keyboard or mouse.

If one of these situations occurs, you must reset the server to recover use of the keyboard and mouse.

Note: If the BIOS or SCU “Front Panel” option is also enabled, the front panel power on/off function is locked until you enter a password. If the front panel is locked and you cannot access the keyboard, you might have to disconnect and reconnect the power cord to reset the server.

Cannot Boot From Hard Drive

The following options must be enabled for you to boot from a hard drive attached to an onboard Adaptec controller.

Option	How to Enable or Disable
SCSI ROM BIOS Scan	**SCU:** SCSI BIOS ROM Options Group, then select applicable SCSI device>Enabled **BIOS Setup**: Advanced>PCI Configuration, then select applicable PCI device>Option ROM Scan>Enabled
Host Adapter BIOS	SCSI*Select* Utility>Set to "Enabled"
Send Start Unit Command	SCSI*Select* Utility>Set to "Yes"
Initiate Wide Negotiation	SCSI*Select* Utility>Set to "Yes"

These options are enabled by default. If you disable them for any reason, you must re-enable them before you can boot from the hard drive.

In addition, you must properly set the "Boot Sequence" in BIOS Setup's Main menu to boot your operating system from disk.

The following table shows where to look for related information on configuring your server using the different utilities:

Utility	Chapter reference
System Configuration Utility (SCU)	Chapter 3 of the *DIGITAL Server 9100 Series System Software Guide*
BIOS Setup Utility	Chapter 4 of the *DIGITAL Server 9100 Series System Software Guide*
SCSI*Select* Utility	Chapter 5 of the *DIGITAL Server 9100 Series System Software Guide*

Cannot Boot From CD-ROM

The following options must be enabled for you to boot from the Platform CD-ROM.

Option	How to Enable or Disable
SCSI ROM BIOS Scan	The configuration utility or BIOS Setup Utility
Host Adapter BIOS (for the adapter to which the CD-ROM device is connected)	SCSI*Select* Utility
BIOS Support for Bootable CD-ROM	SCSI*Select* Utility
BIOS Support for Int13 Extension	SCSI*Select* Utility

These options are enabled by default. If you disable them for any reason, you must re-enable them before you can boot from the Platform CD-ROM.

BIOS Corrupted During System BIOS Upgrade

If the BIOS is corrupted during a flash memory upgrade procedure (for example, due to a power failure or an inability to read the BIOS diskette which results in a fatal BIOS upgrade error) and the server cannot be booted at all:

- Place the flash recovery jumper in the “Recovery” position on the primary system board.
- Insert the recovery BIOS diskette into the diskette drive and power on the server.

  Note: The diskette activity light is the only visual indication that system BIOS recovery is taking place; the screen remains blank during the recovery process. When the recovery cycle begins, there is a single beep. You will know that BIOS recovery has successfully completed when you hear a single, long beep.
- After the BIOS recovery is complete, power down the server and reposition the flash recovery jumper to the normal position.

Problems with Application Software

If you have problems with application software:

- Verify that the software is properly configured for the server. Refer to the software installation and operation documentation for instructions on installing and using the software.
- Try a different copy of the software to see if the problem is with the copy of the software you are using.

If other software runs correctly on the server, contact your software vendor to determine the reason for the software failure.

If the problem persists, contact the software vendor’s customer service representative for assistance.

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