Dell™ PowerEdge™ 1750 Systems Service Manual

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your computer.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.

Basic Troubleshooting

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- Initial User Contact
- External Visual Inspection
- Observing the Boot Routine
- Internal Visual Inspection
- Running the System Diagnostics

Performing basic troubleshooting procedures can often reveal the source of a system problem or indicate a starting point for servicing the system.

Perform the following procedures in the order presented.

Initial User Contact

Ask the user to describe the problem and the conditions under which it occurs. Then perform the following steps:

1. Have the user back up the data on the hard drive, if possible.

   Refer the user to the documentation provided with the operating system or application software for information about backing up data.

2. Have the user duplicate the problem.

   If the user cannot duplicate the problem, proceed to "External Visual Inspection."

3. Observe the user's actions for errors such as typing an incorrect key combination or entering a command incorrectly.

   If the problem is a result of user error, instruct the user in the proper procedure. If it is not, proceed to "External Visual Inspection."

External Visual Inspection

1. Inspect the status indicators for indications of component malfunction.

2. Turn off the system and all attached peripherals.

3. Verify that all power cables are properly connected to the system, peripherals, and their power sources.

4. Ensure that cables are properly connected to devices.

5. If a monitor is used, inspect the monitor controls for obvious damage or improper settings.

   For proper settings of the monitor controls, see the monitor documentation.

6. If a keyboard is used, inspect the keyboard to ensure that keys are not sticking.

   If keys are sticking, replace the keyboard.

7. Inspect the system and peripherals for signs of physical damage.

   If a peripheral is damaged, see the peripheral documentation. If the system is damaged, see "Internal Visual Inspection."

Observing the Boot Routine

NOTE: Most steps in this procedure require observation of system functions and indications, some of which can occur simultaneously. You may need to reboot the system several times to complete all of these steps.

1. If the system is off, turn on all peripherals and the system. If the system is on, reboot the system.

2. During the boot routine, observe the system for any of the following indications:

   - Beep codes indicate an error condition. See "System Beep Codes."

   - System error messages indicate problems or provide status information. See "System Messages."

   - Drive indicators light when data is transferred to or from the drives. If a drive indicator fails to light during the boot routine, troubleshoot the appropriate drive subsystem.

   - Three indicators on the upper-right corner of the keyboard should flash momentarily.

     If the indicators flashed, proceed to the next step.

     If the indicators did not flash, replace the keyboard with a keyboard that you know works. If the problem persists, troubleshoot the system

power supply. If the troubleshooting procedure indicates that the system power supply is working, troubleshoot the memory. See the *Installation and Troubleshooting Guide.*

3. Observe the power-supply indicators.

   If the fault indicator(s) is lit, troubleshoot the system power supply. See the *Installation and Troubleshooting Guide.*

Internal Visual Inspection

⊘ **NOTICE:** Before proceeding with the internal visual inspection, save all open files and exit all open applications, if possible.

Visual inspection of a system's interior can often locate the source of a problem, such as a loose expansion card or cable connector. See "Jumpers and Connectors" to locate components referenced in the inspection procedure.

1. If your system has the optional front bezel installed, remove the bezel. See "Optional Front Bezel."

2. Turn off the system, including attached peripherals, and disconnect the system from the electrical outlets.

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.**

3. Open the system covers. See "Opening the System Covers."

⚠ **CAUTION: The microprocessor and heat-sink assembly can get extremely hot during system operations. Ensure that both components have had sufficient time to cool before touching them.**

⚠ **CAUTION: When handling the processor and heat-sink assembly, avoid sharp edges on the heat sink.**

4. Ensure that all components (memory modules, expansion cards, and processors) are properly and securely installed. See "Removing and Replacing System Components."

5. Verify that all jumpers are set correctly. See "Jumpers and Connectors."

6. Ensure that all cables inside the system are firmly attached to their appropriate connectors.

7. Close the system covers. See "Closing the System Covers."

8. If the system has an optional front bezel, install the bezel. See "Replacing the Bezel."

9. Reconnect the system to the electrical outlet and turn on the system, including attached peripherals.

   If the problem is resolved, no further steps are necessary. If the problem is not resolved, proceed to "Observing the Boot Routine."

Running the System Diagnostics

You can run system diagnostics from either the utility partition on your hard drive or from a set of diskettes that you create from the *Dell OpenManage Server Assistant* CD.

From the Utility Partition

1. As the system boots, press <F10> during POST.

2. From the utility partition's main menu under **Run System Utilities**, select **Run System Diagnostics**.

From the Diagnostics Diskettes

1. Create a set of diagnostics diskettes using the *Dell OpenManage Server Assistant* CD.

   See "Using the Dell OpenManage Server Assistant CD" in the *User's Guide* for information on creating diskettes.

2. Insert the first diagnostics diskette.

3. Reboot the system.

When you start system diagnostics, a message is displayed stating that the diagnostics are initializing. Next, the **Diagnostics** menu appears. The menu allows you to run all or specific diagnostics tests or to exit system diagnostics.

📝 **NOTE:** Before you read the rest of this section, start system diagnostics so that you can see the utility on your screen.

System Diagnostics Testing Options

To select an option from the **Diagnostics** menu, highlight the option and press <Enter>, or press the key that corresponds to the highlighted letter in the option.

provides a brief explanation of testing options.

Table 2-1. System Diagnostics Testing Options

Testing Option	Function
Quick Tests	Performs a quick check of the system. Select **Test All Devices** and then select **Quick Tests**. This option runs device tests that do not require user interaction and that run quickly. Use this option to quickly assess the source of your problem.
Test One Device	Tests a particular device.
Extended Tests	Performs a more thorough check of the system. Select **Test All Devices** and then select **Extended Tests**.
Advanced Testing	Checks a particular area of the system. The main system diagnostics screen lists the system's device groups and the system's service tag number.
Information and Results	Displays test result data.
Program Options	Sets various test parameters.
Device Configuration	Displays an overview of the devices in the system.
Exit to MS-DOS	Exits the diagnostics and returns to the **Diagnostics** menu.

Indicators, Codes, and Messages

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The system, applications, and operating systems can identify problems and alert you to them. Any of the following can indicate when the system is not operating properly:

- System indicators
- System messages
- Beep codes
- Warning messages
- Diagnostics messages
- Alert messages

This section describes each type of message, lists the possible causes, and provides steps to resolve any problems indicated by a message. The system indicators and features are illustrated in this section.

Indicators on the Optional Bezel

The optional system bezel incorporates a system status indicator divided into blue and amber system status indicators. See Figure 3-1. The blue indicator lights up when the system is operating correctly. The amber caution indicator lights up when the system needs attention due to a problem with power supplies, fans, system temperature, system memory, or hard drives.

Table 3-1 lists the system's indicator patterns. Different patterns are displayed as events occur in the system.

Figure 3-1. System Status Indicators
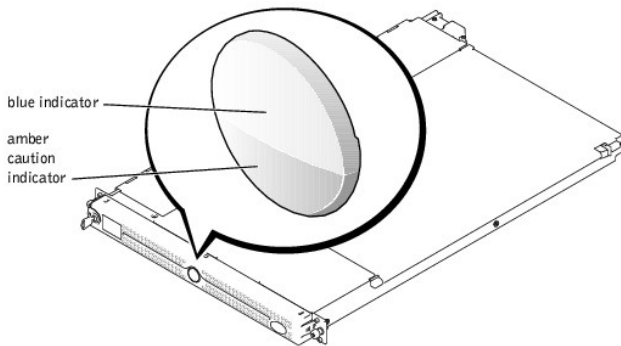
Table 3-1. System Status Indicator Patterns

Blue Indicator	Amber Caution Indicator	Description
Off	Off	Power is not available to the system, or power is available to the system, but the system is not powered on.
Off	Blinking	The system has detected an error.
On	Off	Power is on, and the system is operational.
Blinking	Off	The indicator has been activated to identify the system in a rack.
NOTE: While the system is being identified, the blue indicator blinks even though an error has been detected. After the system is identified, the blue indicator stops blinking and the amber indicator resumes blinking.		

Front-Panel Features

Figure 3-2 shows the controls, indicators, and connectors located behind the optional bezel on the system's front panel. Table 3-2 provides a description of each feature.

Figure 3-2. Front-Panel Features
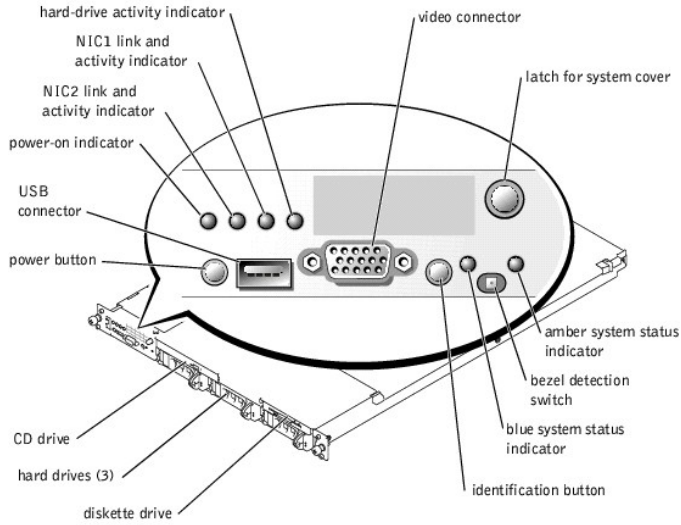
Table 3-2. Front-Panel LED Indicators, Buttons, and Connectors

Indicator, Button, or Connector	Icon	Description
Blue system status indicator		The blue system status indicator lights up during normal system operation. Both the systems management software and the identification buttons located on the front and back of the system can cause the blue system status indicator to flash to identify a particular system.
Amber system status indicator		The amber system status indicator flashes when the system needs attention. Check for a problem with the power supplies, fans, system temperature, or hard drives. **NOTE:** If the system is connected to AC power and an error has been detected, the amber system status indicator flashes regardless of whether the system has been powered on.
NIC1 and NIC2 link and activity indicators		The link and activity indicators for the two integrated NICs light intermittently when the NICs are in use.
Hard-drive activity indicator		The green hard-drive activity indicator flashes when the hard drives are in use. See Figure 3-3 for more information on hard-drive indicators.
Power-on indicator, power button		The power-on indicator lights when the system power is on. The power button controls the DC power supply output to the system. **NOTE:** If you turn off the system using the power button and the system is running an ACPI-compliant operating system, the system performs a graceful shutdown before the power is turned off. If the system is not running an ACPI-compliant operating system, the power is turned off immediately after the power button is pressed.
Identification button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pushed, the blue system status indicator on the front and back blinks until one of the buttons is pushed again.
USB connector		Connects a USB 1.1-compliant device to the system.
Video connector		Connects a monitor to the system.

	🖵	

SCSI Hard-Drive Indicator Codes

If the optional ROMB card is activated, two indicators on each of the hard-drive carriers provide information about the status of the hard drives. See Figure 3-3 and Table 3-3. The SCSI backplane firmware controls the drive power-on/fault indicator.

Figure 3-3. SCSI Hard-Drive Indicators

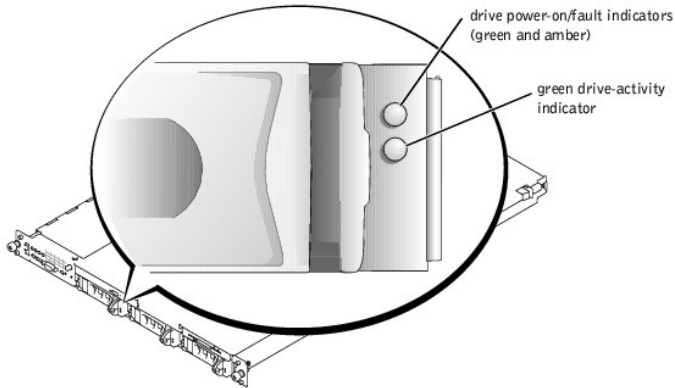Table 3-3 lists the drive indicator patterns. Different patterns are displayed as drive events occur in the system. For example, if a hard drive fails, the "drive failed" pattern appears. After the drive is selected for removal, the "drive being prepared for removal" pattern appears, followed by the "drive ready for insertion or removal" pattern. After the replacement drive is installed, the "drive being prepared for operation" pattern appears, followed by the "drive online" pattern.

🖉 **NOTE:** If the optional ROMB card is not installed, only the "drive online" indicator pattern appears. The drive-activity indicator also blinks when the drive is being accessed.

Table 3-3. SCSI Hard-Drive Indicator Patterns

Condition	Indicator Pattern
Identify drive	The green power-on/fault indicator blinks four times per second.
Drive being prepared for removal	The green power-on/fault indicator blinks two times per second.
Drive ready for insertion or removal	Both drive indicators are off.
Drive being prepared for operation	The green power-on/fault indicator is on.
Drive predicted failure	The power-on/fault indicator slowly blinks green, amber, and off.
Drive failed	The amber power-on/fault indicator blinks four times per second.
Drive rebuilding	The green power-on/fault indicator blinks slowly.
Drive online	The green power-on/fault indicator is on.

Back-Panel Features

Figure 3-4 shows the controls, indicators, connectors, and expansion slots located on the system's back panel.

l   For information about the connectors, see "System Board Connectors" in "Jumpers and Connectors."

l   The blue and amber system status indicator combines the functions of the separate blue and amber system status indicators on the front panel. For more information, see Table 3-2.

l   For information about the identification buttons located on the front and back of the system, see "Front-Panel Features."

l   For PCI card information, see "Expansion Cards."

🖉 **NOTE:** Connect the power cable to connector PS1 if your system only has one power supply. See Figure 3-4.

Figure 3-4. Back-Panel Features and Indicators
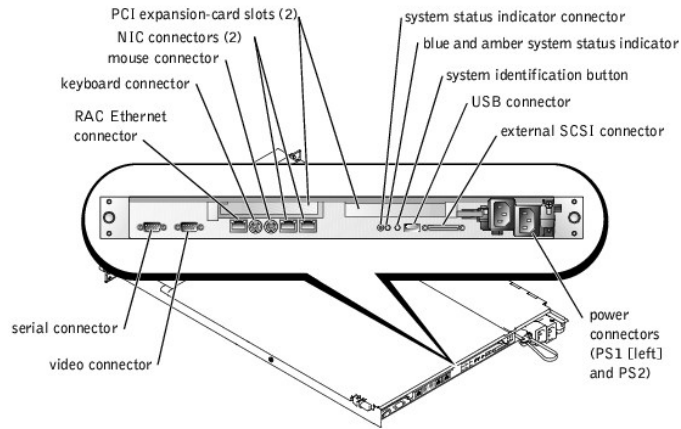
Power-Supply Features

Each hot-pluggable power supply has three indicators, visible when the system covers are open, that indicate whether power is present or whether a power fault has occurred. See Figure 3-5 and Table 3-4 for more information about the indicators. See "System Covers" for information about accessing the inside of the system.

Figure 3-5. Power-Supply Features
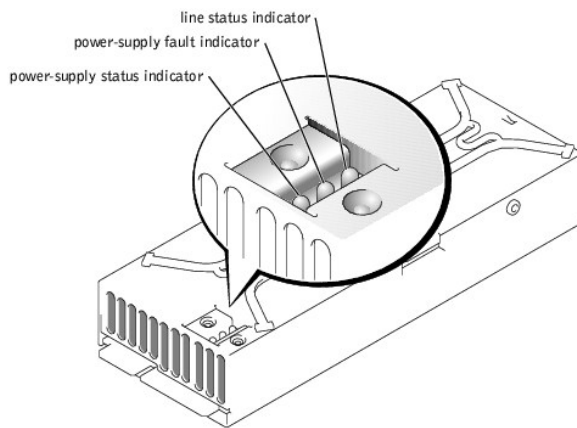
Table 3-4. Power-Supply Indicator Patterns

Indicator	Indicator Code
Line status	Green indicates that a valid power source is connected to the system.
Power-supply fault	Red indicates a problem with the power supply.
Power-supply status	Green indicates that the power supply is operational.

System Messages

System messages alert you to a possible operating system problem or to a conflict between the software and hardware. Table 3-5 lists the system error messages that can occur and the probable cause for each message.

✍ **NOTE:** If you receive a system message that is not listed in Table 3-5, check the documentation for the application that is running when the message appears or the operating system's documentation for an explanation of the message and recommended action.

Table 3-5. System Messages

Message	Causes	Corrective Actions
Address mark not found	Faulty diskette/CD drive subsystem or hard-drive subsystem (defective system board).	Replace the system board. See "System Board."
Amount of available memory limited to 256 MB!	**OS Install Mode** is enabled in the System Setup program.	Disable the **OS Install Mode**. See "Using the System Setup Program."
Alert! One or more of the memory DIMMs are out of rev.	One or more of the installed DIMMs are not supported by the system. DIMMs must be registered DDR SDRAM rated for 266-MHz operation.	Ensure that all installed memory meets the system specifications. See "Memory."
Alert! Redundant memory disabled! Memory configuration does not support redundant memory.	One memory bank is not populated, or memory banks are different sizes. To support redundant memory, both banks must be populated, and all four DIMMs must be the same size.	Install identical DIMMs in all four memory banks. See "Memory."
Alert! Unsupported memory, incomplete sets, or unmatched sets. The following memory DIMM(s) have been disabled: DIMM_xx	DIMMs are installed in a mismatched pair, or one memory slot in a bank is empty. Memory must be installed in matched pairs. In a mismatched memory bank, neither DIMM is used.	Ensure that memory is installed in matched pairs. See "Memory."
Auxiliary device failure	Mouse or keyboard cable connector loose or improperly connected; defective mouse or keyboard.	Check the mouse and keyboard cable connections. See "External Visual Inspection."
Attachment failed to respond.	Diskette drive or hard-drive controller cannot send data to associated drive.	Reseat drives and check the interface connections to the SCSI backplane. Reboot the system. If you receive an error message from the SCSI, RAID, or diskette controller, replace the diskette drive or hard drive. See "Internal SCSI Hard Drives" or "Installing a Diskette Drive."
Bad error-correction code (ECC) on disk read. Controller has failed.	Faulty diskette drive, tape drive, or hard-drive subsystem (defective backplane board).	Replace the system board. See "System Board."
BIOS Update Attempt Failed!	Remote BIOS update attempt failed.	Retry the BIOS update.
Caution! NVRAM_CLR jumper is installed on system board – please run SETUP program.	NVRAM_CLR jumper is installed.	Remove the NVRAM_CLR jumper. See Figure 5-2 for jumper location.
CPUs with different cache sizes detected.	Two different types of microprocessors are installed.	Install a correct version of the microprocessor so that both microprocessors have the same level 2 cache size. See "Microprocessors."
Data error	Faulty diskette, diskette drive, or hard drive.	Replace the diskette. Reseat all drives, check cable connections, and reboot the system. If the problem persists, replace the diskette drive or hard drive. See "Installing a Diskette Drive" or "Internal SCSI Hard Drives."
Decreasing available memory	One or more memory modules improperly seated or faulty.	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules.
Diskette drive 0 seek failure Diskette drive 1 seek failure	Faulty or improperly inserted diskette or incorrect configuration settings in System Setup program.	Reseat the diskette drive and replace the diskette. See "Installing a Diskette Drive." Run the System Setup program to correct the diskette drive type. See "Using the System Setup Program." If the problem persists, replace the diskette drive.
Diskette read failure	Faulty diskette, or faulty or improperly connected diskette drive.	Reseat the diskette drive and replace the diskette. See "Installing a Diskette Drive."
Diskette subsystem reset failed	Faulty diskette/CD drive controller (defective system board).	Replace the system board. See "System Board."
Diskette write protected	Diskette write-protect feature is enabled.	Disable the write-protect feature on the diskette.
Drive not ready	Diskette missing from or improperly inserted into the diskette drive.	Reinsert the diskette into the drive.
ECC memory error	Improperly seated or faulty memory modules.	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules.
Embedded server management error Embedded server management is not present	Embedded server management memory may be temporarily corrupted.	To clear the embedded server management memory, shut down the system, disconnect the power cord(s), wait approximately 30 seconds, and then reconnect the power cord(s) and restart the system. If the problem persists, replace the system board. See "System Board."
Error: Dell Remote Access Controller initialization failure	Defective RAC or system board.	Replace the RAC. See the RAC documentation. If the problem persists, replace the system board. See "System Board."
Gate A20 failure	Faulty keyboard controller (defective system board).	Replace the system board. See "System Board."
General failure	Application program or operating system failure.	Reboot. If the message reappears, see your software documentation.
Hard disk controller failure Hard disk read failure	Incorrect configuration settings in the System Setup program, improperly connected hard drive, or faulty hard-drive controller subsystem (defective system board).	Check the hard-drive configuration settings in the System Setup program. See "Using the System Setup Program." Reinstall the hard drive. See "Internal SCSI Hard Drives" or "External SCSI Hard Drives." If the problem persists, replace the system board. See "System Board."
Invalid configuration information – please run SETUP program.	Invalid configuration settings in the System Setup program, or the system battery is faulty.	Check the System Setup configuration settings. See "Using the System Setup Program." Replace the battery. See "System Battery."

`Invalid memory configuration detected. Potential for data corruption exists!`	Memory modules are not installed in matched pairs.	Install memory modules in matched pairs. See "Memory."
`Invalid NVRAM configuration, resource re-allocated`	System configuration data has been ignored.	Check the System Setup configuration settings. See "Using the System Setup Program."
`I/O card parity interrupt at address`	Expansion card(s) is improperly installed or faulty.	Reinstall the expansion card(s). See "Expansion Cards." If the problem persists, replace the expansion card(s).
`Keyboard controller failure`	Defective keyboard/mouse controller (defective system board).	Replace the system board. See "System Board."

`Keyboard data line failure`
 	
`Keyboard stuck key failure`
 	
`Keyboard clock line failure`
 	
`Keyboard failure`
	Keyboard cable connector is loose or improperly connected; defective keyboard; defective keyboard/mouse controller (defective system board).	Check the keyboard cable connection. Replace the keyboard. If the problem persists, replace the system board. See "System Board."

`Memory allocation error`	Memory module(s) is not connected properly, or an application program or the operating system failed.	Reseat the modules. See "Memory." Reboot the system. If the message reappears, see your software documentation.

`Memory address line failure at address, read value expecting value`
 	
`Memory high data line failure at start address to end address`
 	
`Memory high address line failure at start address to end address`
 	
`Memory double word logic failure at start address to end address`
 	
`Memory double word logic failure at address, read value expecting value`
 	
`Memory odd/even logic failure at start address to end address`
 	
`Memory odd/even logic failure at address, read value expecting value`
 	
`Memory write/read failure at address, read value expecting value`
 	
`Memory write/read failure at start address to end address`
	Faulty or improperly seated memory modules or defective system board.	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules. If the problem persists, replace the system board. See "System Board."

`Memory parity failure at start address to end address`
 	
`Memory parity error at address`
	Improperly seated or faulty memory modules.	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules.

`No boot device available`	Faulty diskette, diskette/CD drive subsystem, hard drive, or hard-drive subsystem; no boot disk in drive A.	Replace the diskette. Replace the diskette drive or the hard drive. See "Installing a Diskette Drive" or "Internal SCSI Hard Drives." If the problem persists, replace the system board. See "System Board."
`No boot sector on hard- disk`	No operating system on the hard drive.	Check the hard-drive configuration settings in the System Setup program. See "Using the System Setup Program."
`No timer tick interrupt`	Defective system board.	Replace the system board. See "System Board."
`No PXE-capable device available`	<F12> was pressed during POST and no PXE devices are detected.	Check the cables connected to the NICs. Check the configuration settings in the System Setup program for the NICs. See "Using the System Setup Program."
`Non-system disk or disk error`	Faulty diskette, diskette drive subsystem, or hard-drive subsystem.	Replace the diskette. Reseat all drives and reboot the system. If the error message reappears, replace the system board. See "System Board."
`Not a boot diskette`	No operating system on diskette.	Use a bootable diskette.
`PCI BIOS failed to install`	PCI device (option ROM) **checksum** failure is detected during shadowing.	Contact the PCI device manufacturer to obtain a suitable replacement PCI option ROM. Follow the manufacturer's instructions to install the option ROM.
`Plug & Play Configuration Error`	Error encountered when initializing the PCI device, or the system board is defective.	Install the NVRAM_CLR jumper and reboot the system. See Figure 5-2 for jumper location. If the problem persists, replace the system board. See "System Board."
`Plug & Play Configuration Error PCI_n`	Error encountered when initializing the PCI adapter.	Install the NVRAM_CLR jumper and reboot the system. See Figure 5-2 for jumper location. If the problem persists, replace the specified expansion card. See "Expansion Cards." If the problem persists, replace the system board. See "System Board."
`Primary backplane error`	Improperly attached or missing backplane.	Ensure that the SCSI backplane board is fully seated. See "SCSI Backplane Board."

`Primary IDE device 0 not found`
 	
`Primary IDE device 1 not found`
	Improperly connected or missing IDE device.	Ensure that the device's interface cable is securely connected to the SCSI backplane board. See "Installing a Diskette Drive" or "Installing a CD Drive." If the problem persists, replace the device.

`Processor 1 internal error`
 	
`Processor 2 internal error`
	Defective microprocessor or system board (reported by the NMI handler).	Replace the specified microprocessor. See "Microprocessors." If the problem persists, replace the system board. See "System Board."

`Processor 1 is a 533-MHz system bus processor`
 	
`Processor 2 is a 533-MHz system bus processor`
	Two 533-MHz microprocessors are installed. This system supports only Intel® Xeon™ 400-MHz front-side-bus processors.	Reboot the system. If you receive beep code 4-4-3 (processor frequency mismatch), replace both processors with Intel Xeon 400-MHz front-side-bus processors. See "Microprocessors."
		
		If a beep code does not occur at system boot, turn off the system, install the NVRAM_CLR jumper, and reboot the system. See Figure 5-2 for jumper location.

`Processor bus error`
 	
`PCI bus error`
 	
`IMB bus error`
	Defective system board (reported by the NMI handler).	Replace the system board. See "System Board."

`Processor x is not a 533-MHz system bus processor`
 	
`This system bus speed is not supported on this system board`
	This system supports only Intel Xeon 533-MHz front-side bus (system bus) processors.	Reboot the system. If you receive beep code 4-4-3 (processor frequency mismatch), replace processor x with a supported processor. See "Microprocessors."
		
		If a beep code does not occur at system boot, turn off the system, install the NVRAM_CLR jumper, and reboot the system. See Figure 5-2 for jumper location.

`Read fault`
 	
`Requested sector not found`
	Faulty diskette, diskette-drive subsystem, or hard-drive subsystem.	Replace the diskette. Reseat all drives and reboot the system. If the message reappears, replace the diskette drive. See "Installing a Diskette Drive." If the problem persists, replace the system board. See "System Board."

`Reset failed`	Improperly connected diskette/tape drive, hard drive, or power cable.	Check the drive and cable connections, and reset the system again.
`ROM bad checksum = address`	Expansion card improperly installed or faulty.	Reinstall the expansion card. See "Expansion Cards." If the problem persists, replace the expansion card.

`Sector not found`
 	
`Seek error`
 	
`Seek operation failed`
	Defective sectors on diskette or hard drive.
	
	Faulty diskette, diskette-drive subsystem, or hard-drive subsystem.
		Replace the diskette, or reseat all drives and reboot the system. See "Installing a Diskette Drive" or "Internal SCSI Hard Drives." If the message reappears, replace the drive(s). If the problem persists, replace the system board. See "System Board."

`Shutdown failure`	Defective system board.	Replace the system board. See "System Board."
`System backplane error`	Improperly attached or missing SCSI backplane.	Reseat the SCSI backplane. See "SCSI Backplane Board."
`System halted! Must power down.`	Wrong password entered too many times.	Reboot the system and enter the correct password. If the problem persists, see "Disabling a Forgotten Password."
`System parity error`	Defective expansion card(s) or improperly seated or faulty memory modules (reported by the NMI handler).	Replace the expansion cards one at a time until the error is corrected. See "Expansion Cards." Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules. If the problem persists, replace the system board. See "System Board."

`The following memory DIMMs are unsupported: DIMM_xx.`
 	
`This system only supports 266 MHz DIMMs.`
	One or more of the installed DIMMs has a frequency less than 266 MHz. System **memory must be rated for 266 MHz.**	Replace lower-speed DIMM(s) with modules rated for 266-MHz operation. See "Memory."

`This processor system bus speed is unknown.`
 	
`System halted!`
	The installed microprocessor is not supported by the system.	Reboot the system. If you receive beep code 4-4-3 (processor frequency mismatch), replace the installed microprocessor(s) with microprocessor(s) supported by your system. See "Microprocessors."
		
		If a beep code does not occur at system boot, turn off the system, install the NVRAM_CLR jumper, and reboot the system. See Figure 5-2 for jumper location.

`This system only supports 400-MHz system bus speed.`
 	
`System halted!`
	Two 533-MHz microprocessors are installed. This system supports only Intel Xeon 400-MHz front-side-bus processors.	Reboot the system. If you receive beep code 4-4-3 (processor frequency mismatch), replace both processors with Intel Xeon 400-MHz front-side-bus processors. See "Microprocessors."
		
		If a beep code does not occur at system boot, turn off the system, install the NVRAM_CLR jumper, and reboot the system. See Figure 5-2 for jumper location.

`Time-of-day clock stopped`	Defective battery or faulty chip (defective system board).	Replace the system battery. See "System Battery." If the problem persists, replace the system board. See "System Board."
`Time-of-day not set - please run SETUP program`	Incorrect **Time** or **Date** settings or defective system battery.	Check the **Time** and **Date** settings. See "Using the System Setup Program." If the problem persists, replace the system battery. See "System Battery." If the problem persists, replace the system board. See "System Board."
`Timer chip counter 2 failed`	Defective system board.	Replace the system board. See "System Board."
`Unsupported CPU combination`	Microprocessor combination is not supported by the system.	Install a supported microprocessor combination. See "Microprocessors."
`Unsupported CPU stepping detected.`	Microprocessor is not supported by the system.	Install the correct version of the microprocessor in the specified microprocessor socket. See "Microprocessors."
`Utility partition not available`	<F10> key was pressed during POST, but	Create a utility partition on the boot hard drive. See

	no utility partition exists on the boot hard drive.	"Using the Dell OpenManage Server Assistant CD" in your *User's Guide*.

`Warning: Detected mode change from SCSI to RAID on channel x of the embedded RAID subsystem.`
 	
`Warning: Detected missing RAID hardware for the embedded RAID subsystem. Data loss will occur! Press Y to switch mode to SCSI, press any other key to disable both channels. Press Y to confirm the change; press any other key to cancel.`
	Type of controller has changed since previous system boot.	Back up information on the hard drives before changing the type of controller used with the drives.

`Warning: Detected mode change from RAID to SCSI on channel x of the embedded RAID subsystem.`
 	
`Warning: Detected missing RAID hardware for the embedded RAID subsystem. Data loss will occur! Press Y to switch mode to SCSI, press any other key to disable both channels. Press Y to confirm the change; press any other key to cancel.`
	Type of controller has changed since previous system boot.	Back up information on the hard drives before changing the type of controller used with the drives.

`Warning! Embedded SCSI- RAID error`	Faulty RAID adapter, or ROMB card firmware is either corrupted or is the wrong version.	Reseat the ROMB card. See "ROMB Card." If the message reappears, replace the ROMB card.
`Warning! Embedded SCSI- RAID firmware is not present!`	ROMB card firmware is either corrupted or is the wrong version.	Reseat the ROMB card. See "ROMB Card." Reboot the system. If the message reappears, replace the ROMB card."
`Warning! Firmware is out- of-date, please update`	Out-of-date firmware.	Update the system firmware. See "Using the Dell OpenManage Server Assistant CD" in your *User's Guide* for information about updating the system firmware.
`Warning! No microcode update loaded for processor x`	BIOS is not current.	Update the BIOS, but do not turn the system off before the update. See "Using the System Setup Program."
`Warning! Remote Access Controller command failure`	Command protocol failure between the RAC and ESM3.	Reseat the RAC in its system board connector. See "Opening the System Covers," and then see Figure 5-3 for the location of the RAC Ethernet connector. If the message reappears, replace the RAC. If the problem persists, replace the system board. See "System Board."
`Warning! Unsupported Remote Access Controller firmware version detected`	RAC firmware is corrupted or is the wrong version.	Reseat the RAC in its system board connector. See "Opening the System Covers," and then see Figure 5-3 for the location of the RAC Ethernet connector. If the message reappears, replace the RAC.

`Write fault`
 	
`Write fault on selected drive`
	Faulty diskette or hard drive.	Replace the diskette. If the problem persists, replace the diskette drive. See "Installing a Diskette Drive." If the problem persists, replace the hard drive. See "Internal SCSI Hard Drives."

System Beep Codes

When an error that cannot be reported on the monitor occurs during a boot routine, the system may emit a series of beeps that identify the problem.

NOTE: If the system boots without a keyboard, mouse, or monitor attached, the system will not issue beep codes related to these peripherals.

When a beep code is emitted, record it on a copy of the Diagnostics Checklist (located in "Getting Help" in the *Installation and Troubleshooting Guide*), and then look it up in Table 3-6. If you are unable to resolve the problem by looking up the meaning of the beep code, use the system diagnostics to identify a more serious cause.

Table 3-6. System Beep Codes

Code	Cause	Corrective Action
1-1-2	Microprocessor register test failure	Replace microprocessor 1. See "Microprocessors." If the problem persists, replace microprocessor 2.
1-1-3	CMOS write/read failure	Replace the system board. See "System Board."
1-1-4	BIOS checksum failure	This fatal error usually requires replacement of the BIOS firmware. Reflash the BIOS firmware.
1-2-1	Programmable interval-timer failure	Replace the system board. See "System Board."
1-2-2 1-2-3	DMA initialization failure DMA page register write/read failure	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules. If the problem persists, replace the system board. See "System Board."
1-3-1	Main-memory refresh verification failure	
1-3-2	No memory installed	
1-3-3	Chip or data line failure in the first 64 KB of main memory	
1-3-4	Odd/even logic failure in the first 64 KB of main memory	
1-4-1	Address line failure in the first 64 KB of main memory	
1-4-2	Parity failure in the first 64 KB of main memory	

2-1-1 through 2-4-4	Bit failure in the first 64 KB of main memory	
3-1-**1**	Slave DMA-register failure	Replace the system board. See "System Board."
3-1-2	Master DMA-register failure	
3-1-3	Master interrupt-mask register failure	
3-1-4	Slave interrupt-mask register failure	
3-2-4	Keyboard-controller test failure	Check the keyboard cable and connector for proper connection. If the problem persists, replace the keyboard. If the problem persists, replace the system board. See "System Board."
3-3-1	CMOS failure	Replace the system board. See "System Board."
3-3-2	System configuration check failure	
3-3-3	Keyboard controller not detected	
3-3-**4**	Screen initialization failure	
3-4-2	Screen-retrace test failure	
3-4-3	Search for video ROM failure	
4-2-1	No timer tick	
4-2-2	Shutdown failure	
4-2-3	Gate A20 failure	
4-2-4	Unexpected interrupt in protected mode	Ensure that all expansion cards are properly seated, and then reboot the system. See "Expansion Cards."
4-3-1	Improperly seated or faulty memory modules	Remove and reseat the memory modules. See "Memory." If the problem persists, replace the memory modules. If the problem persists, replace the system board. See "System Board."
4-3-3	Defective system board	Replace the system board. See "System Board."
4-3-4	Time-of-day clock stopped	Replace the battery. See "System Battery." If the problem persists, replace the system board. See "System Board."
4-4-1	Super I/O chip failure (defective system board)	Replace the system board. See "System Board."
4-4-3	Microprocessor frequency mismatch. Occurs when the front-side (external) bus speed of a microprocessor is not supported.	If video is available, a screen message identifies the faulty microprocessor. Replace the microprocessor with a supported microprocessor. See "Microprocessors." If video is not available, replace microprocessor 1 and then, if the problem persists, replace microprocessor 2.
4-4-4	Cache test failure (defective microprocessor)	Remove and reseat the microprocessor(s). See "Microprocessors." If the problem persists, replace the microprocessor(s). If the problem persists, replace the system board. See "System Board."

System Board LED Codes

The system board LEDs are visible only when the covers are open. Table 3-7 lists the system board LED codes and their meanings.

Table 3-**7. System Board LED Codes**

LED Indicator	Normal Operation	Error Condition
FAN*n*_LED (Located by each fan.)	Green	Blinking amber: A problem exists with the associated fan.
THERMTRIP (Located near the front left corner of the system board.)	Off	Amber: One or both of the processors are overheated.
MISMATCH (Located near the front left corner of the system board.)	Off	Amber: Processors do not match.
VRM1_OK (Located near the edge of the system board by VRM1.)	Green	Off: Processor 1 VRM is disabled.
VRM2_OK (Located near the edge of the system board by VRM2.)	Green if two processors are installed or off if only one processor is installed.	Off if two processors are installed.
D_12V (Located near the front left corner of the system board, near the PS_PWR connector.)	Green	Off: System 12-V power is not available.
D_3VAUX (Located near the front left corner of the system board, near the PS_PWR connector.)	Green	System 3.3-V auxiliary power is not available.

Warning Messages

A warning message alerts you to a possible problem and asks you to take corrective action before the system continues a task. For example, before you format a diskette, a message may warn you that you may lose all data on the diskette, as a way to protect against inadvertently erasing or writing over the data. These warning messages usually interrupt the procedure and require you to respond by typing y (yes) or n (no).

NOTE: Warning messages are generated by either the application program or the operating system. See "Finding Software Solutions" in the *Installation and Troubleshooting Guide* and the documentation that accompanied the operating system or application program for further information.

Diagnostics Messages

When you run system diagnostics, an error message may result. Diagnostic error messages are not covered in this section. Record the message on a copy of the Diagnostics Checklist (located in "Getting Help" in the *Installation and Troubleshooting Guide*), and then follow the instructions in that section for obtaining technical assistance.

Alert Messages

Systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more information, see the systems management software documentation.

Jumpers and Connectors

Dell™ PowerEdge™ 1750 Systems Service Manual

- Jumpers—A General Explanation
- System Board Jumpers
- System Board Connectors
- SCSI Backplane Board Connectors
- PCI Card Connectors

This section provides specific information about the jumpers on the system board. It also provides some basic information on jumpers and switches and describes the connectors and sockets on the various boards in the system.


Jumpers—A General Explanation

Jumpers provide a convenient and reversible way of reconfiguring the circuitry on a printed circuit board. When reconfiguring the system, you may need to change jumper settings on the system board. You may also need to change jumper settings on expansion cards or drives.

Jumpers

Jumpers are small blocks on a circuit board with two or more pins emerging from them. Plastic plugs containing a wire fit down over the pins. The wire connects the pins and creates a circuit. To change a jumper setting, pull the plug off its pin(s) and carefully fit it down onto the pin(s) indicated. Figure 5-1 shows an example of a jumper.

Figure 5-1. Example Jumper
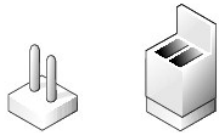
⚠️ **CAUTION: Make sure the system is turned off before you change a jumper setting. Otherwise, damage to the system or unpredictable results may occur.**

A jumper is referred to as open or unjumpered when the plug is pushed down over only one pin or if there is no plug at all. When the plug is pushed down over two pins, the jumper is referred to as jumpered. The jumper setting is often shown in text as two numbers, such as 1-2. The number 1 is printed on the circuit board so that you can identify each pin number based on the location of pin 1.

System Board Jumpers

Figure 5-2 shows the location and default settings of the jumper blocks on the system board. See Table 5-1 for the designations, default settings, and functions of the system's jumpers.
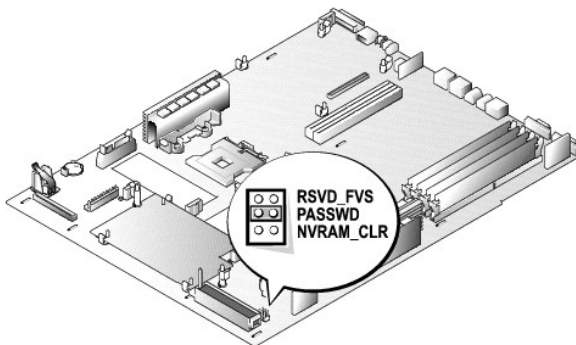
Figure 5-2. System Board Jumpers

Table 5-1. System Board Jumper Settings

Jumper	Setting		Description
RSVD_FVS	⬚⬚		Reserved (*do not change*).
PASSWD	⬚⬚	(default)	The password feature is enabled.
	⬚⬚		The password feature is disabled.
NVRAM_CLR	⬚⬚	(default)	The configuration settings are retained at system boot.
	⬚⬚		The configuration settings are cleared at next system boot. (If the configuration settings become corrupted to the point where the system will not boot, install the jumper plug and boot the system. Remove the jumper before restoring the configuration information.)

jumpered ⬚⬚ unjumpered ⬚⬚

System Board Connectors

See <u>Figure 5-3</u> and <u>Table 5-2</u> for the descriptions and locations of the system board connectors.
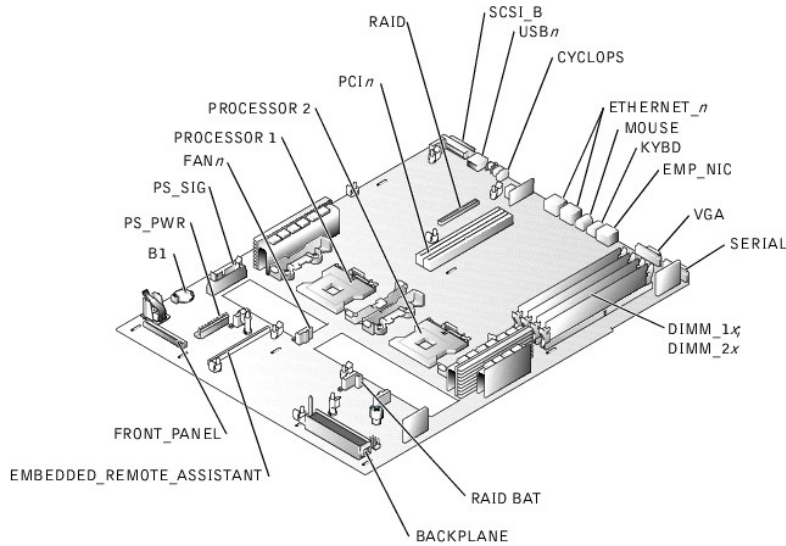
Figure 5-3. System Board Connectors and Sockets

**Table 5-2. System Board Connectors and Sockets**

Connector or Socket	Description
BACKPLANE	SCSI backplane board connector
B1	System battery connector
CYCLOPS	Cable-management arm system status connector
DIMM_1x; DIMM_2x	Memory module sockets
EMBEDDED_REMOTE_ ASSISTANT	Connector for optional RAC
EMP_NIC	RAC Ethernet port connector
ETHERNET_*n*	NIC connectors (2) **NOTE:** If you purchased a 400-MHz front-side bus system with a preinstalled Gigabit PCI network card, the integrated NIC connectors are nonfunctional.
FAN*n*	Cooling fan power connectors (six on system board; one on control panel assembly)
FRONT_PANEL	System control panel connector
KYBD	Keyboard connectors
MOUSE	Mouse connector
PCI*n*	PCI riser board connector
PROCESSOR 1	Microprocessor socket 1

PROCESSOR 2	Microprocessor socket 2
PS_PWR	System board power connector
PS_SIG	Power supply signal connector
RAID	Socket for optional ROMB card
RAID BAT	Backup battery connector for ROMB card
SCSI_B	External SCSI connector
SERIAL	Serial port connector
USB*n*	USB connector
VGA	VGA connector

SCSI Backplane Board Connectors

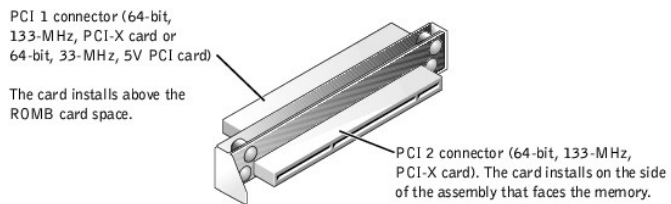Figure 5-4 shows the location of the connectors on the top of the SCSI backplane board.

Figure 5-4. Connectors on the SCSI Backplane Board
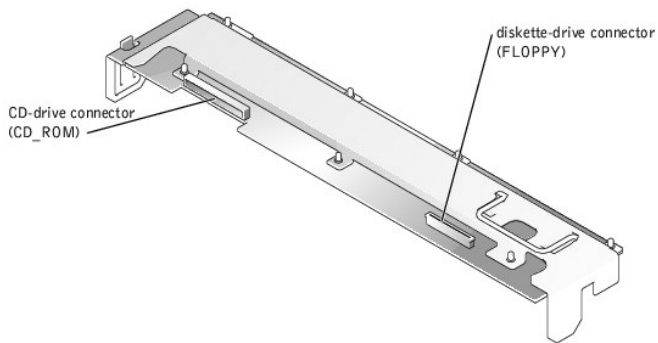
PCI Card Connectors

Figure 5-5 identifies the two PCI-X card connectors on the PCI riser board assembly.

Figure 5-5. Riser-Board Expansion-Card Connectors

System Overview
Dell™ PowerEdge™ 1750 Systems Service Manual

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System Features

The system offers the following features:

l One or two Intel® Xeon™ microprocessors with an internal operating speed of at least 1.8 GHz for the 400-MHz processor and 2.4 GHz for the 533-MHz processor, a level 2 cache of 512 KB, and a front-side bus operating at 400 or 533 MHz.

l Support for symmetric multiprocessing (SMP), which is available on systems with two Intel Xeon microprocessors. SMP greatly improves overall system performance by dividing microprocessor operations between independent microprocessors. To take advantage of this feature, you must use an operating system that supports multiprocessing.

NOTE: If you decide to upgrade your system by installing a second microprocessor, you must order the microprocessor upgrade kits from Dell. Not all versions of the Intel Xeon microprocessor will work properly as additional microprocessors. The upgrade kit from Dell contains the correct version of the microprocessor as well as the instructions for performing the upgrade. Both microprocessors must have the same internal operating frequency and cache size.

l A minimum of 256 MB of PC-266 registered DDR SDRAM memory modules, upgradable to a maximum of 8 GB by installing combinations of 128-MB, 256-MB, 512-MB, 1-GB, or 2-GB 2-way interleaving memory modules in the four memory module sockets on the system board.

l Support for up to three 1-inch, internal U320 SCSI hard drives (with hot-plug capability when using the optional ROMB card).

l A single, 1.44-MB, 3.5-inch diskette drive.

l An IDE CD or DVD drive.

l Up to two hot-pluggable, 320-W power supplies in a 1 + 1 redundant configuration.

l Seven hot-pluggable system cooling fans.

The system board includes the following features:

l A riser board assembly that supports up to two PCI expansion cards (two 3.3-V, 64-bit, 133-MHz PCI-X cards or one 3.3-V, 64-bit, 133-MHz PCI-X card and one 5-V, 64-bit, 33-MHz PCI card)

l An integrated VGA-compatible video subsystem with an ATI RAGE XL video controller. This video subsystem contains 8 MB of SDRAM video memory (nonupgradable). Maximum resolution is 1600 x 1200 with 64,000 colors; 32-bit color depth is available for true-color graphics in the following resolutions: 640 x 480, 800 x 600, 1024 x 768, and 1280 x 1024. See the operating system documentation for additional supported video modes.

l An integrated, dual-channel U320 SCSI host adapter. The internal channel supports up to three SCSI hard drives on the SCSI backplane. The SCSI backplane automatically configures SCSI ID numbers and SCSI termination, greatly simplifying drive installation. The second SCSI channel (an external SCSI channel) is available at the back of the system.

l Optional ROMB through a separate RAID controller that incorporates 128 MB of cache memory and a RAID battery.

l A Gigabit Ethernet PCI network card or two integrated Gigabit Ethernet NICs, capable of supporting 10-Mbps, 100-Mbps, and 1000-Mbps data rates.

l Optional remote access controller (RAC) for remote system management.

l Back-panel connectors include mouse, keyboard, serial, video, USB, external SCSI, RAC Ethernet, and two integrated NIC connectors.

l Front-panel connectors include a video and a USB connector.

For more information about specific features, see "Technical Specifications."

Service Features

The system includes the following service features to facilitate troubleshooting and repair:

l Systems management circuitry that monitors operation of the system fans as well as critical system voltages and temperatures. The systems management circuitry works in conjunction with the systems management software.

l System diagnostics for evaluating system components and devices. For information about using the system diagnostics, see "Running the System Diagnostics."

Supported Operating Systems

l Microsoft® Windows® 2000 Server and Advanced Server

l Microsoft Windows Server 2003 Standard Edition, Enterprise Edition, and Web Edition (when available)

l Red Hat® Linux 8.0 and Red Hat Linux Advanced Server 2.1

l Novell® NetWare® 6.0

Software Features

The following software is included with your system:

l A System Setup program for quickly viewing and changing system configuration information. For more information on this program, see "Using the System Setup Program."

l Enhanced security features, including a system password and a setup password, available through the System Setup program.

l Video drivers for displaying many popular application programs in high-resolution modes.

l SCSI device drivers that allow the operating system to communicate with devices attached to the integrated SCSI subsystem.

l Systems management software and documentation CDs.

Power Protection Devices

Certain devices protect your system from the effects of problems such as power surges and power failures.

l PDU — Uses circuit breakers to ensure that the AC current load does not exceed the PDU's rating.

l Surge protector — Prevents voltage spikes, such as those that may occur during an electrical storm, from entering the system through the electrical outlet. They do not protect against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

l Line conditioner — Maintains a system's AC power source voltage at a moderately constant level and provides protection from brownouts, but does not protect against a complete power loss.

l UPS — Uses battery power to keep the system running when AC power is unavailable. The battery is charged by AC power while it is available so that after AC power is lost, the battery can provide power to the system for a limited amount of time—from 5 minutes to approximately an hour. A UPS that provides only 5 minutes of battery power allows you to shutdown the system. Use surge protectors and PDUs with all universal power supplies, and ensure that the UPS is UL-safety approved.

Other Documents You May Need

⚠ The *System Information Guide* provides important safety and regulatory information. Warranty information may be included within this document or as a separate document.

l The *Rack Installation Guide* included with your rack solution describes how to install your system into a rack.

l The *Getting Started Guide* document provides an overview of initially setting up your system.

l The *User's Guide* provides information about system features and technical specifications

l The *Installation and Troubleshooting Guide* describes how to troubleshoot the system and install and replace system components.

l The *Dell Remote Access Controller Installation and Setup Guide* provides complete information about installing, configuring, and using a RAC to remotely access a system.

l Systems management software documentation describes the features, requirements, installation, and basic operation of the software.

l Operating system documentation describes how to install (if necessary), configure, and use the operating system software.

l The *System Administrator's Guide* provides system operation and management operation.

l Documentation for any components you purchased separately provides information to configure and install these options.

l Updates are sometimes included with the system to describe changes to the system, software, and/or documentation.

📝 **NOTE:** Always read the updates first because they often supersede information in other documents.

l Release notes or readme files may be included to provide last-minute updates to the system or documentation or advanced technical reference material intended for experienced users or technicians.

Technical Specifications

Microprocessor	
Microprocessor type	up to two Intel Xeon microprocessors with a minimum internal operating frequency of at least 1.8 GHz for the 400-MHz processor and 2.4 GHz for the 533-MHz processor
Front-side bus speed	100 or 133 MHz
Address bus speed	200 or 266 MHz (doubled address transfer rate)
Data bus speed	400 or 533 MHz (quadrupled data transfer rate)
Internal cache	512 KB or 1 MB level 2 cache
Math coprocessor	internal to microprocessor

Expansion Bus	
Bus type	PCI, PCI-X
Expansion slots	two 3.3-V, 64-bit, 133-MHz PCI-X slots or one 3.3-V, 64-bit, 133-MHz PCI-X slot and one 5-V 64-bit, 33-MHz PCI slot

Memory	
Architecture	72-bit ECC PC-266 registered DDR SDRAM DIMMs, with 2-way interleaving
Memory module sockets	four 72-bit wide 168-pin DIMM sockets
Memory module capacities	128-MB, 256-MB, 512-MB, 1-GB, or 2-GB registered DDR SDRAM DIMMs, rated for 266-MHz operation
Minimum RAM	256 MB
Maximum RAM	8 GB

Drives	
Hard drives	up to three 1-inch, internal U320 SCSI
Diskette drive	3.5-inch, 1.44-MB diskette drive
CD or DVD drive	IDE CD or DVD drive

Connectors	
Externally accessible:	
Back:	
SCSI	68-pin U320 SCSI connector
Serial	9-pin connector
USB	4-pin connectors
NIC	two RJ45 connectors for integrated 10/100/1000-Mbps NICs
RAC	one RJ45 connector for optional RAC (100-Mbps Ethernet controller)
Video	15-pin connector
PS/2-style keyboard	6-pin mini-DIN connector
PS/2-compatible mouse	6-pin mini-DIN connector
Front:	
Video	15-pin connector
USB	4-pin connector

Video	
Video type	ATI Rage XL PCI video controller; VGA connector
Video memory	8 MB

Power	
Power supply:	
Wattage	320 W (AC)
Voltage	100–240 VAC, 50/60 Hz, 3.9–2.0 A
Heat dissipation	1026 BTU/hr maximum per power supply
Maximum inrush current	Under typical line conditions and over the entire system ambient operating range, the inrush current may reach 25 A per power supply for 10 ms or less.
System battery	3.0-V lithium ion coin cell

Physical	
Height	4.2 cm (1.67 inches)
Width	44.7 cm (17.6 inches)
Depth	68.3 cm (26.9 inches)
Weight (maximum)	15.9 kg (35 lb)

Environmental	
Temperature:	
Operating	10° to 35°C (50° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)
Relative humidity:	
Operating	8% to 85% (noncondensing) with a humidity gradation of 10% per hour
Storage	5% to 95% (noncondensing)
Maximum vibration:	
Operating	0.25 G at 3 to 200 Hz at 0.5 octaves per minute in the positive z axis
Storage	0.5 G at 3 to 200 Hz at 0.5 octaves per minute in the positive and negative x, y, and z axes
Maximum shock:	
Operating	1 shock pulse in the positive and negative x, y, and z axis (1 pulse on each side of the system) of 41 G for up to 2 ms
Storage (non-operational)	six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms
Operational:	
Half sine operational shock	31G @ 2.6 milliseconds in the operating axis (one shock)
Non-operational:	
Non-operational half sine shock	71G @ 2 milliseconds
Non-operational square wave shock	32G @ 270 inches/sec
Altitude:	
Operating	–16 to 3,048 m (–50 to 10,000 ft)
Storage	–16 to 10,600 m (–50 to 35,000 ft)

Removing and Replacing System Components
Dell™ PowerEdge™ 1750 Systems Service Manual

The procedures in this guide require that you remove the cover and work inside the system. While working inside the system, do not attempt to service the system except as explained in this manual and elsewhere in the system documentation. Always follow the instructions closely and review all of the procedures in "Safety Instructions" in the *System Information Guide.*

⚠ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

This section provides servicing procedures for components inside the system. Before you start any of these procedures, perform the following tasks:

l Perform the procedures described in "External Visual Inspection."

l ⚠ Read the safety information in the *System Information Guide*.

When a replacement procedure is not provided, use the removal procedure in reverse order to install the replacement part.

Recommended Tools

l Key to the system keylock

l #1 and #2 Phillips screwdrivers

l Wrist grounding strap

Optional Front Bezel

The optional front bezel has system status indicators. A lock on the bezel restricts access to the power button, diskette drive, CD drive, hard drive(s), and the interior of the system.

Removing the Bezel

To remove the bezel, use the system key to unlock the keylock on the bezel, press the tab at each end of the bezel, and then pull the bezel away from the system. See Figure 4-1.

Figure 4-1. Removing and Replacing the Optional Front Bezel

keylock
front bezel
tabs (2)
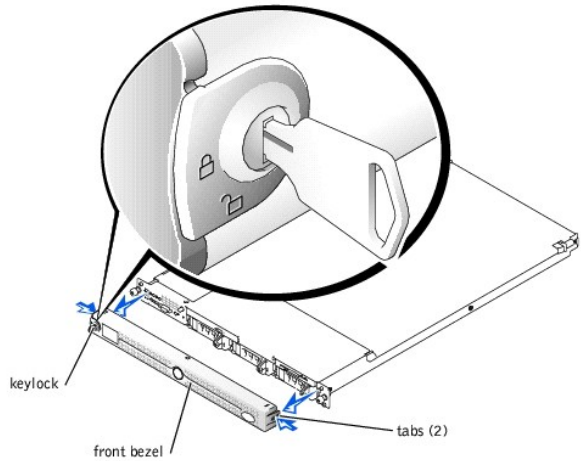
Replacing the Bezel

To replace the front bezel, fit the tabs on the bezel into the corresponding slots in the front panel and lock the keylock.
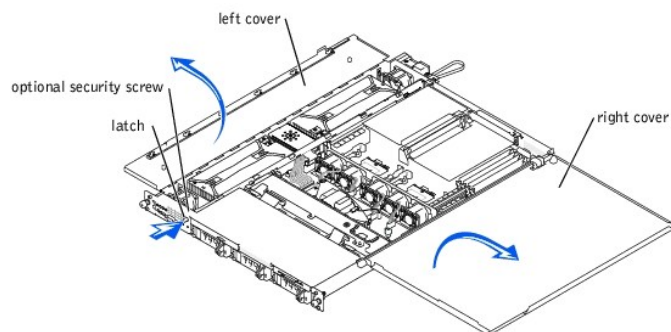
System Covers

Two covers on the top of the system provide access to the system board and other internal components.

Opening the System Covers

⚠ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Slide the system out of the rack.

2. If the front bezel is installed, remove the front bezel. See "Optional Front Bezel."

3. If the optional security screw is installed on the system cover (see Figure 4-2), remove it now.

Figure 4-2. Opening the System Covers

left cover
optional security screw
latch
right cover

4. Press the latch on the system front panel and lift the left cover.

5. Lift the right cover.

Closing the System Covers

1. Close the right (larger) cover first and then close the left cover.

2. Press firmly on the left cover to snap the securing latch into place.

3. Replace the optional front bezel, if one was installed. See "Replacing the Bezel."

Inside the System

In Figure 4-3, the system covers are open and the bezel is removed to provide an interior view of the system.

Figure 4-3. Inside the System
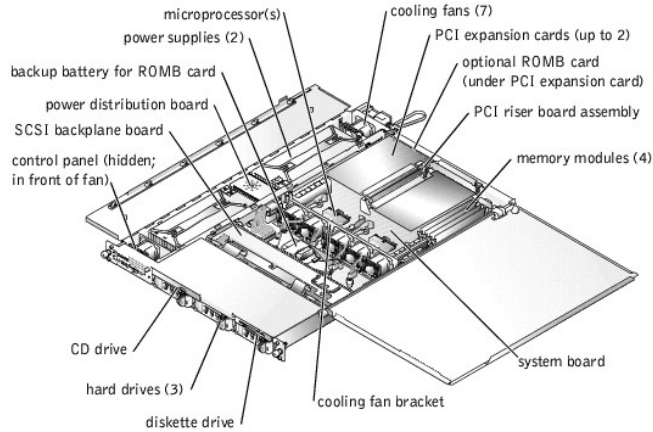
The system board can accommodate one or two microprocessors. The PCI riser board assembly accommodates up to two PCI expansion cards. Up to four memory modules may be installed on the system board.

The hard-drive bays provide space for up to three 1-inch SCSI hard drives. SCSI hard drives are connected to a SCSI controller on the system board through the SCSI backplane board.

The peripheral bays provide space for an optional 3.5-inch diskette drive and a CD drive.

The power distribution board (PDB) provides hot-plug logic and power distribution for the system. Two hot-pluggable, redundant power supplies provide power to the system board and internal peripherals.

> **NOTICE:** If you purchased a system with redundant power supplies, you must connect both power cables to the system; otherwise, the fans operate at the maximum RPM, which increases the fan noise. To ensure redundancy, connect the power cables to two different electrical power sources.

During an installation or troubleshooting procedure, you may be required to change a jumper. For information about the system board jumpers, see "Jumpers and Connectors."


Expansion Cards

Up to two half-length, PCI-X expansion cards can be installed in the system, one on each side of the riser board assembly. See Figure 4-4. The riser board assembly consists of two riser boards permanently attached to each other with plastic standoffs. It plugs into twin riser connectors on the system board and is considered an extension of the system board. See Figure 5-3.

The PCI slot locations are marked on the system board as PCI 1 and PCI 2. The PCI 1 connector on the riser board assembly is higher than the PCI 2 connector, because the PCI 1 card installs above the optional ROMB card.

Two different PCI card configurations are available:

   l   Two PCI-X, 64-bit, 133-MHz, 3.3-V expansion cards

   l   One PCI-X, 64-bit, 133-MHz, 3.3-V expansion card in PCI 2, and one PCI, 64-bit, 33-MHz, 5-V expansion card in PCI 1.

Figure 4-4. Riser-Board Expansion-Card Connectors
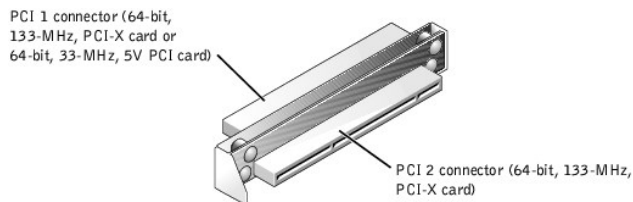
⚠ **CAUTION: Before you perform the following procedure, you must turn off the system and disconnect it from its power source. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Installing an Expansion Card

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Prepare the expansion card for installation.

   See the documentation that came with the expansion card for information about configuring the card, making internal connections, or otherwise customizing the card for your system.

4. Open the system covers. See "Opening the System Covers."

5. Remove the filler bracket from the expansion slot.

Figure 4-5. Installing an Expansion Card
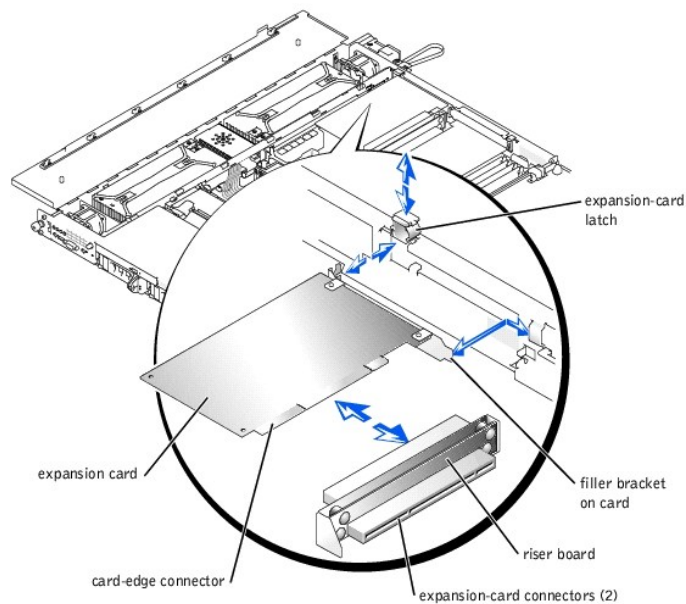
6. Slide the plastic expansion-card latch in the chassis wall up to the release position, and pivot it back to allow card insertion.

7. Insert the card-edge connector firmly into the expansion-card connector on the riser board.

8. Press in until the card is fully seated, ensuring that the card's filler bracket also fits correctly into the expansion-slot opening. See Figure 4-5.

9. When the card is seated in the connector, pivot the expansion-card latch back and press it down firmly.

10. Connect any cables that should be attached to the card.

    See the documentation supplied with the card for information about its cable connections.

11. Close the system covers. See "Closing the System Covers."

12. Reconnect the system and peripherals to their electrical outlets, and turn them on.

13. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Removing an Expansion Card

⚠ **CAUTION: Before you perform this procedure, you must turn off the system and disconnect it from its power source. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Disconnect any cables connected to the card.

5. Slide the plastic expansion-card latch in the chassis wall up to the release position. See Figure 4-5. Pivot the latch back to allow for card removal.

6. Grasp the expansion card by its edges, and remove it from the expansion-card connector.

7. If you are removing the card permanently, install a metal filler bracket over the empty card-slot opening.

   ![NOTE icon] **NOTE:** Installing a filler bracket over an empty expansion slot is necessary to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

8. Pivot the expansion-card latch back into position and press it down firmly.

9. Close the system covers. See "Closing the System Covers."

10. Reconnect the system and peripherals to their electrical outlets, and turn them on.

11. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Memory

The four memory module sockets on the system board can accommodate from 256 MB to 8 GB of registered DDR SDRAM. See Figure 4-6.

Memory Module Upgrade Kits

The system is upgradable to 8 GB by installing combinations of 128-, 256-, 512-MB, 1-GB, or 2-GB registered memory modules. You can purchase memory upgrade kits as needed.

![NOTE icon] **NOTE:** The memory modules must be rated for 266-MHz operation.

Memory Module Installation Guidelines

Starting with the socket closest to the edge of the system board, the memory module sockets are labeled DIMM_1A and DIMM_1B (bank 1) and DIMM_2A and DIMM_2B (bank 2). See Figure 4-6. When you install memory modules, follow these guidelines:

l   You must install memory modules in matched pairs (bank 1 DIMMs must match; bank 2 DIMMs must match).

l   Install a pair of memory modules in bank 1 before installing a second pair in bank 2.

Figure 4-6. Memory Module Sockets
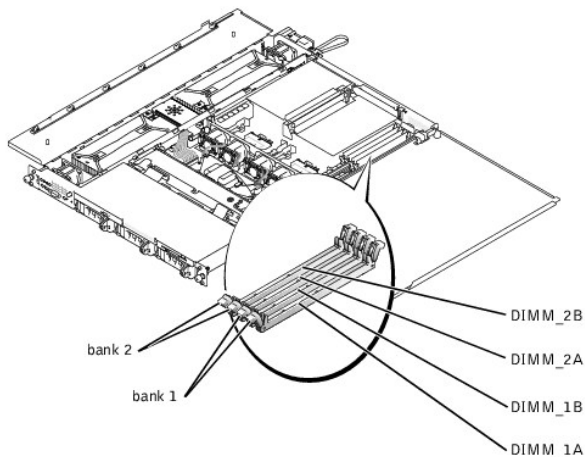
Table 4-1 illustrates several sample memory configurations based on these guidelines.

Table 4-1. Sample Memory Configurations

	BANK1		BANK2	
Total Desired Memory	DIMM_1A	DIMM_1B	DIMM_2A	DIMM_2B
256 MB	128 MB	128 MB	none	none
512 MB	256 MB	256 MB	none	none
1 GB	256 MB	256 MB	256 MB	256 MB
4 GB	1 GB	1 GB	1 GB	1 GB
8 GB	2 GB	2 GB	2 GB	2 GB

Performing a Memory Module Upgrade

To perform a memory module upgrade to the system board, perform the following steps.

⚠️ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Locate the memory module sockets in which you will install or replace memory modules.

   Figure 4-6 identifies the memory module banks on the system board and shows the order of the socket designations.

5. Install or replace the memory modules as necessary to reach the desired memory total. See "Installing Memory Modules" or "Removing Memory Modules."

6. Close the system covers. See "Closing the System Covers."

7. Reconnect the system to the electrical outlet, and turn on the system.

   After the system completes the POST routine, it runs a memory test. The system detects that the new memory does not match the system configuration information and displays an error message.

8. Press <F2> to enter the System Setup program, and check the **System Memory** setting on the System Setup screens.

   The system should have already changed the value in the **System Memory** setting to reflect the newly installed memory.

9. If the **System Memory** value is incorrect, one or more of the memory modules may not be installed properly. Repeat step 2 through step 7, ensuring that the memory modules are firmly seated in their sockets.

10. Run the system memory test in the system diagnostics.

11. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Installing Memory Modules

To install a memory module, perform the following steps:

1. To open the memory module socket, press down and outward on the socket latches. See Figure 4-7.

Figure 4-7. Installing a Memory Module
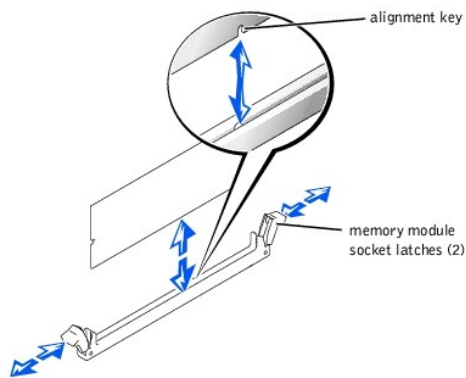
2. Align the memory module's edge connector with the slot in the center of the memory module socket, and insert the memory module straight down into the socket. See Figure 4-7.

   The module and the socket are keyed to prevent misalignment.

3. Press down on the memory module with your thumbs until the latches snap up around the module, securing it. See Figure 4-7.

   When the memory module is properly seated in the socket, the latches on the memory module socket should align with the latches on the other sockets with memory modules installed.

Removing Memory Modules

To remove a memory module, press down and outward on the socket latches on each end of the socket until the memory module pops out of the socket. See Figure 4-8.

Figure 4-8. Removing Memory Modules

memory module
socket latches (2)
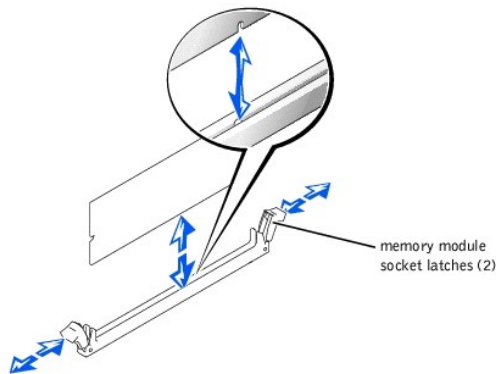
Microprocessors

Your system contains up to two Intel® Xeon™ 400- or 533-MHz front-side bus microprocessors. The 400-MHz front-side bus processors provide a minimum internal operating frequency of at least 2.0 GHz, with a front-side bus speed of 100 MHz, an address bus speed of 200 MHz (doubled address transfer rate), and a data bus speed of 400 MHz (quadrupled data transfer rate).

The system's DDR SDRAM memory modules, which are rated for 266-MHz operation, run at 200 MHz in a system using a 400-MHz front-side bus processor.

To take advantage of future options in speed and functionality, you can add a second microprocessor or replace either the primary or secondary microprocessor.

● **NOTICE:** The second microprocessor must be of the same type and speed as the first microprocessor.

⚠ **CAUTION: Ensure that you install only microprocessors purchased from Dell and intended for this system. Using a different microprocessor could cause data loss, system damage, or personal injury.**

Each microprocessor and its associated level 2 (L2) cache memory are contained in an FC-PGA2 package that is installed in a ZIF socket on the system board. The secondary microprocessor must have the same operating frequency and cache size as the primary microprocessor.

The following items are included in the microprocessor upgrade kit:

- l   A microprocessor
- l   A heat sink
- l   Two retention clips

✎ **NOTE:** When installing a new microprocessor, always use the new heat sink that is shipped with the microprocessor upgrade kit. Thermal interface grease on the underside of the heat sink is critical to maintaining optimum contact between the heat sink and the microprocessor. Used or older heat sinks may not have enough grease remaining on them to ensure proper contact.

The following subsections describes how to remove and install a microprocessor in either the primary or secondary microprocessor connector.
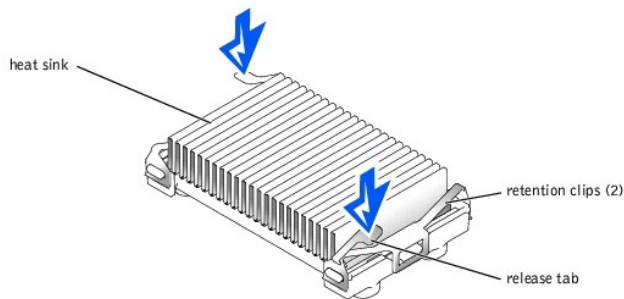
Removing a Microprocessor

⚠ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. To remove the two retention clips that secure the heat sink to the microprocessor socket at both ends, press down firmly on the release tab of each retention clip until it disengages from the socket. See Figure 4-9.

● **NOTICE:** Never remove the heat sink from a microprocessor unless you intend to remove the microprocessor. The heat sink is necessary to maintain proper thermal conditions.

⚠ **CAUTION: The microprocessor chip and heat sink can become extremely hot. Be sure that the microprocessor has had sufficient time to cool before handling.**

Figure 4-9. Retention Clip


heat sink

retention clips (2)

release tab

5. Remove the heat sink.

🛑 **NOTICE:** Be careful not to bend any of the pins when removing the microprocessor. Bending the pins can permanently damage the microprocessor.

6. Remove the microprocessor from the socket by pulling the socket release lever straight up until the processor is released, and then lift the processor out of the socket. See Figure 4-10.

   If you are installing a new microprocessor, leave the release lever up so that the socket is ready for the new microprocessor.

Figure 4-10. Removing the Microprocessor
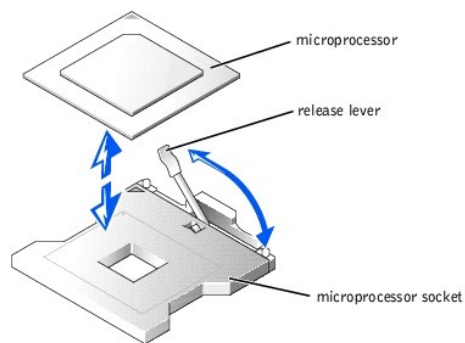
microprocessor

release lever

microprocessor socket

Installing a Microprocessor

⚠️ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Some systems have a plastic heat-sink filler plate installed over an unused microprocessor socket. If you are installing a second microprocessor and the plate is present, remove the plate by pressing in the two top tabs and lifting the plate away.

🛑 **NOTICE:** Be careful not to bend any of the pins when unpacking the microprocessor. Bending the pins can permanently damage the microprocessor.

5. Unpack the new microprocessor.

🛑 **NOTICE:** Identifying the pin-1 corners is critical to positioning the processor correctly.

6. Identify the pin-1 corner of the microprocessor, indicated by a tiny gold triangle on the top of the microprocessor. See Figure 4-11.

Figure 4-11. Pin-1 Identification

pin-1 corner
(gold triangle)
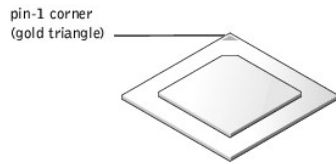
🛑 **NOTICE:** Positioning the microprocessor incorrectly can permanently damage the processor and the system when you turn on the system.

7. Align the pin-1 corner of the microprocessor with the pin-1 corner of the microprocessor socket, which is also identified by a small triangle. See Figure 4-12.

Figure 4-12. Installing the Microprocessor

pin-1 corners
of chip and
socket aligned
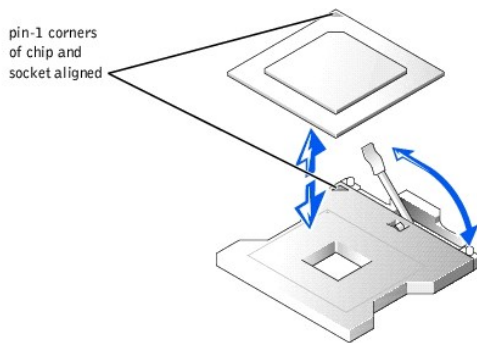
8. Install the microprocessor in the socket. See Figure 4-12.

    a. If the release lever on the microprocessor socket is not all the way up, move it to that position now. See Figure 4-12.

🛑 **NOTICE:** When placing the microprocessor in the socket, be sure that all of the pins on the processor go into the corresponding holes of the socket. Be careful not to bend the pins.

    b. With the pin-1 corners of the processor and socket aligned, set the processor lightly in the socket and make sure that all pins are matched with the correct holes in the socket.

       Because the system uses a ZIF microprocessor socket, *you do not need to use force* (which could bend the pins if the microprocessor is misaligned). When the microprocessor is positioned correctly, it should drop down into the socket with minimal pressure.

    c. When the processor is fully seated in the socket, rotate the socket release lever back down until it snaps into place, securing the processor.

9. Peel away and discard the thin plastic cover that protects the thermal grease on the new heat sink.

📝 **NOTE:** To ensure that the proper amount of thermal interface grease is present, use the new heat sink included in the microprocessor upgrade kit.

10. Place the heat sink on top of the microprocessor, grease side down. See Figure 4-13.

11. Replace the two retention clips:

    a. Orient the retention clips. When installed, the clips face opposite directions:

        ι For processor 1, the outer retention clip's release tab faces the back of the system; the inner retention clip faces the opposite direction.

        ι For processor 2, the outer retention clip's release tab faces the front of the system; the inner retention clip faces the opposite direction.

    b. Hook the end of the clip that is opposite the release tab over the retaining tab on the edge of the socket.

    c. Press the clip down so that the hole in the middle of the clip engages the tab in the side of the socket.

    d. Continue pressing down on the release tab (you may need to also press in on the free end of the clip) until the end of the clip snaps over the tab on the corner of the socket. See Figure 4-13.

Figure 4-13. Installing the Heat Sink

retention clips (2)
release tab
heat sink
retaining tabs (6)
microprocessor
microprocessor socket
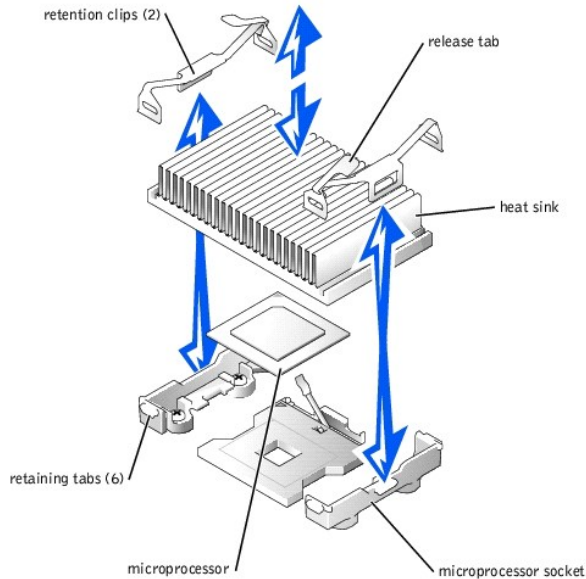
12. Close the system covers. See "Closing the System Covers."

13. Reconnect your system and peripherals to their electrical outlets, and turn them on.

   As the system boots, it detects the presence of the new microprocessor and automatically changes the system configuration information in the System Setup program.

14. Press <F2> to enter the System Setup program, and check that the microprocessor categories match the new system configuration. See "Using the System Setup Program" for instructions.

15. Run the system diagnostics to verify that the new microprocessor is operating correctly.

   See "Running the System Diagnostics" for information on running the diagnostics and troubleshooting any problems that may occur.

16. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

ROMB Card

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

🚫 **NOTICE:** To avoid possible data loss, back up all data on the hard drives before changing the mode of operation of the integrated SCSI controller from SCSI to RAID.
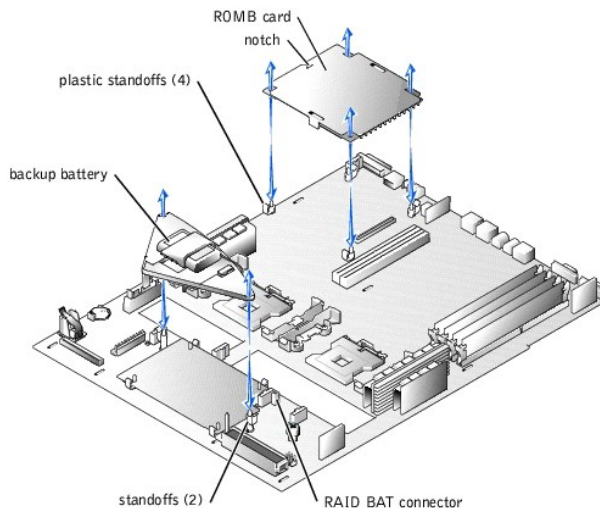
Removing a ROMB Card

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

🚫 **NOTICE:** To avoid possible data loss, back up all data on the hard drives before changing the mode of operation of the integrated SCSI controller from SCSI to RAID.

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. If a PCI card is installed over the ROMB card, remove the PCI card. See "Removing an Expansion Card."

5. Press the four standoff latches outward and pull the ROMB card up out of the standoffs. See Figure 4-14.

6. If a RAC (ERA/O card) is installed beneath the ROMB backup battery, you must remove the SCSI backplane board before removing the battery. If backplane board removal is necessary, see "Removing the SCSI Backplane Board."

7. Remove the ROMB backup battery. See Figure 4-14.

    a. Disconnect the ROMB backup battery from the backup battery connector (RAID BAT).

    b. While pressing the two standoff latches outward, pull the battery assembly up and out of the standoffs.

8. If you removed the SCSI backplane board in step 6, reinstall it now. See "Installing the SCSI Backplane Board."

9. Close the system covers. See "Closing the System Covers."

10. **Reconnect the system and peripherals to their power sources, and turn them on.**

11. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Figure 4-14. ROMB Card and Backup Battery

Installing a ROMB Card

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Locate the ROMB card connector on the system board. See Figure 4-14.

5. If a PCI card is installed over the ROMB card connector, remove it. See "Removing an Expansion Card."

6. If you are replacing an existing ROMB card, remove the card. See "Removing a ROMB Card."

7. Position the new ROMB card with the notch in its plastic cover facing the redundant power supply bay, and align the edges of the card with the four plastic standoffs on the system board.

8. Press down on the three "bulls eyes" on the ROMB card cover until the four plastic standoffs latches snap over the edge of the card. See Figure 4-14.

9. If a RAC (ERA/O card) is installed on the system board, you must remove the SCSI backplane board to install the ROMB backup battery. If backplane board removal is necessary, see "Removing the SCSI Backplane Board."

10. Install the ROMB backup battery:

    a. Position the battery board as shown in Figure 4-14, and press it down into the two standoffs until the latches snap into place.

    b. Plug the battery cable into the RAID BAT connector on the system board.

11. If you removed the SCSI backplane board in step 9, reinstall it now. See "Installing the SCSI Backplane Board."

12. If you removed a PCI card in step 5, replace it. See "Installing an Expansion Card."

13. Close the system covers. See "Closing the System Covers."

14. **Reconnect the system and peripherals to their power sources, and turn them on.**

15. Enter the System Setup program and verify that the setting for the SCSI controller has changed to reflect the presence of the RAID hardware. See "Using the System Setup Program."

16. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

17. Install the RAID software. See the ROMB card software documentation for more information.

Cooling Fans

The five system-board cooling fans and two power-supply cooling fans must be installed and operational at all times. See Figure 4-15. A blinking amber LED next to a fan power connector indicates a faulty fan that needs to be replaced.

⚠️ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

🚫 **NOTICE:** The fans are hot-pluggable. If a fan fails, replace it as soon as possible. Operating the system with a failed fan may cause the system to overheat and lock up.

Removing a Fan

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Open the system covers. See "Opening the System Covers."

3. Locate the faulty cooling fan(s) with the blinking amber LEDs.

4. Before replacing a fan, check the fan's power cable connection to verify that a loose connection is not the problem. If the problem is not resolved, continue with this procedure.

Figure 4-15. Cooling Fan
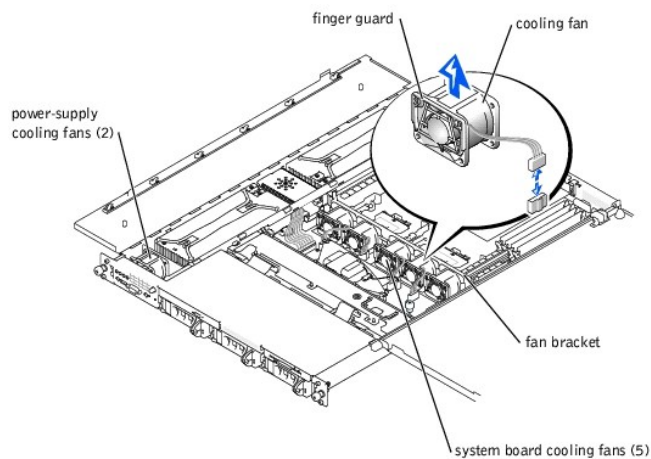
5. Disconnect the fan power cable from the system board or control panel board.

6. Lift the defective fan straight up out of the power-supply bay or fan bracket. See Figure 4-15.

Installing a Fan

1. Remove the failed fan. See "Removing a Fan."

2. Insert the new fan straight down into the power-supply bay or fan bracket. The fans are keyed for correct orientation and cannot be installed backwards:

   l For fans installed in the fan bracket, the finger guard on the fan faces the front of the system.

   l For the two fans installed in the power-supply bays, some systems have fans with the finger guards facing the rear of the system and others have fans with the finger guards facing the front of the system. Install the new fan according to its keyed orientation.

3. Connect the fan power cable to the associated power connector on the system board or control panel board.

4. Close the system covers. See "Closing the System Covers."

5. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

📝 **NOTE:** After installing a new fan, allow up to 30 seconds for the system to recognize the fan and determine whether it is working properly. If the replacement fan does not operate, the control panel, control panel cable, or system board is faulty.

Cooling Fan Bracket

⚠️ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Removing the Fan Bracket

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Locate the fan bracket. See Figure 4-16.

Figure 4-16. Fan Bracket
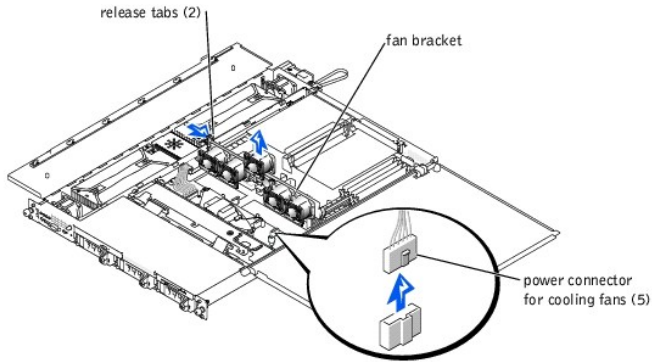
5. Remove the fan bracket with the fans intact:

   a. For each fan mounted in the bracket, disconnect the fan power cable from the system board.

   b. Press the fan bracket release tabs (one at each end of the bracket) and lift the fan bracket out of the system.

   c. Place the fan bracket on a smooth surface and lift each fan straight up out of the bracket.

Installing the Fan Bracket

1. Remove the old fan bracket. See "Removing the Fan Bracket."

2. Insert the fans straight down into the new bracket. Orient the fans so that the finger guards will face the front of the system when the bracket is installed.

3. Lower the fan bracket into the chassis until the two release latches click into place. See Figure 4-16.

4. Connect the fan power cables to their connectors on the system board.

5. Close the system covers. See "Closing the System Covers."

6. Reconnect the system and peripherals to their power sources, and turn them on.

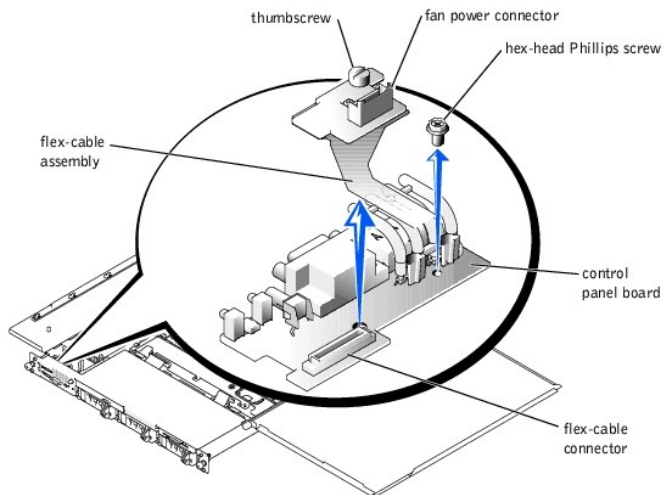7. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Control Panel

⚠️ **CAUTION: Only trained service technicians are authorized to open the system covers and access any of the components inside the system. See the *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Removing the Control Panel

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Locate the control panel. See Figure 4-17.

Figure 4-17. Control Panel

Figure labels: thumbscrew · fan power connector · hex-head Phillips screw · flex-cable assembly · control panel board · flex-cable connector

5. Remove the cooling fan that is located behind the control panel. See "Removing a Fan."

    The fan power cable attaches to the control panel flex cable assembly.

6. Loosen the thumbscrew that secures the flex cable assembly to the control panel board (PLANAR), and lift the flex cable assembly up out of its connector. See Figure 4-17.

7. Remove the hex-head Phillips screw that secures the control panel board to the chassis. See Figure 4-17.

8. Slide the control panel board back and lift it from the system.

Installing a Control Panel

1. Insert the control panel board into the chassis and slide it forward into place.

2. Insert and tighten the hex-head Phillips screw that secures the control panel board to the chassis.

3. Insert the flex-cable assembly into its connector on the control panel board and tighten the thumbscrew.

4. Replace the cooling fan and connect the fan power cable to the power connector on the flex-cable assembly.

5. Close the system covers. See "Closing the System Covers."

6. Reconnect the system and peripherals to their power sources, and turn them on.

7. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Removing and Replacing Power Supplies

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

⚠ **CAUTION: The connectors on the PDB contain high voltage. Do not remove the metal cover from the PDB or touch the connectors on the PDB or power supply.**

📝 **NOTE:** The power supplies are hot-pluggable. Remove and replace only one power supply at a time.

Removing a Power Supply

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Open the system covers. See "Opening the System Covers."

3. Identify the failed supply using the red fault indicator on the top of the supply. See Figure 3-5.

⚠ **CAUTION: Disconnect the AC cord for the failed power supply before removing the power supply.**

4. Disconnect the AC cord for the power supply. To identify the correct power connector, see Figure 3-4.

5. Grasp the power supply handle and slide the power supply away from the power distribution board approximately 0.75 inch (2 cm), and then lift the power supply out of the chassis. See Figure 4-18.

Figure 4-18. Removing a Power Supply

power supply 2
power distribution board
power supply 1
power-supply handle
alignment stud
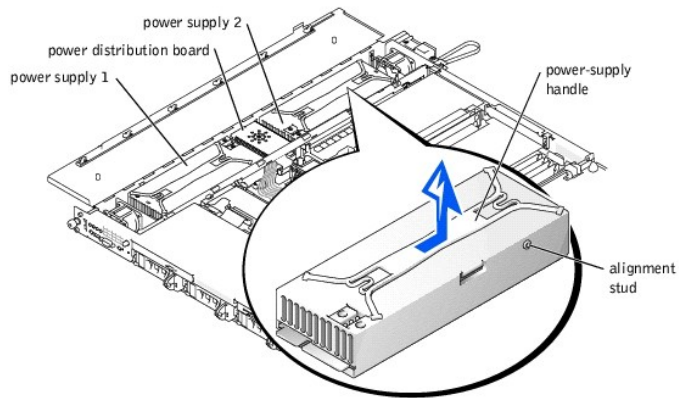
Installing a Power Supply

1. To install the replacement power supply, align the stud on the side of the power supply with the corresponding notch in the chassis wall, and then lower the power supply into the chassis. See Figure 4-18.

2. Slide the power supply toward the PDB until the power supply connector is fully seated in the PDB connector.

3. Close the system covers. See "Closing the System Covers."

   ✍ **NOTE:** If the cover does not close completely over the power supplie(s), one or both power supplies are not properly installed. Remove the power supplie(s) and repeat steps 1 and 2 until the cover closes properly.

4. Replace the optional front bezel, if applicable. See "Replacing the Bezel."


Power Distribution Board

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Removing the Power Distribution Board

⚠ **CAUTION: Avoid touching the cable connectors on the power supplies. Wait 10 to 20 seconds after disconnecting the power cables before removing the power supplies or coming into contact with their cable connectors.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Remove the power supplies. See "Removing a Power Supply."

5. Remove the screw that secures the cover to the PDB, and lift out the cover. See Figure 4-19.

Figure 4-19. Power Distribution Board
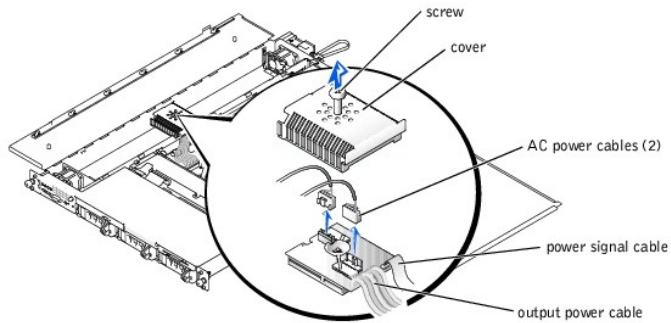
6. Disconnect the output power cable from the PS_PWR connector on the system board.

7. Disconnect the power signal cable from the PS_SIG connector on the system board.

8. Disconnect both of the input power cables from the top of the PDB.

9. Lift the PDB out of the chassis.

Installing a Power Distribution Board

1. Route the PDB's output power cable and power signal cable through the cutout in the side of the power-supply enclosure, and lower the PDB into the chassis.

2. Connect both input power cables to the top of the PDB.

3. Connect the power signal cable to the PS_SIG connector on the system board.

4. Connect the output power cable to the PS_PWR connector on the system board.

5. Place the cover over the PDB and replace the screw.

6. Reinstall the power supplies. See "Installing a Power Supply."

7. Close the system covers. See "Closing the System Covers."

8. **Reconnect the system and peripherals to their power sources, and turn them on.**

9. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

System Battery

The system battery is a 3.0-V, coin-cell battery located on the system board beside the front power supply.

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

⚠ **CAUTION: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**
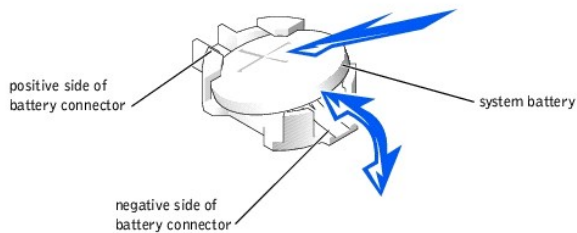
Removing the System Battery

1. Enter the System Setup program and, if possible, make a printed copy of the System Setup screens. See "Using the System Setup Program."

2. Remove the optional front bezel, if present. See "Removing the Bezel."

3. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

4. Open the system covers. See "Opening the System Covers."

⊘ **NOTICE:** To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

5. Remove the system battery. See Figure 5-3 for the battery connector location.

   a. Support the battery connector by pressing down firmly on the positive side of the connector. See Figure 4-20.

   b. While supporting the battery connector, press the battery toward the positive side of the connector and pry it up out of the securing tabs at the negative side of the connector.

Figure 4-20. System Battery

positive side of battery connector

system battery

negative side of battery connector

🔘 **NOTICE:** To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

Installing the System Battery

1. Install the new system battery. See Figure 4-20.

   a. Support the battery connector by pressing down firmly on the positive side of the connector.

   b. Hold the battery with the "+" facing up, and slide it under the securing tabs at the positive side of the connector.

   c. Press the battery straight down into the connector until it snaps into place.

2. Close the system covers. See "Closing the System Covers."

3. Reconnect the system and any attached peripherals to their electrical outlets, and turn them on.

4. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

5. Enter the System Setup program to confirm that the battery is operating properly. See "Using the System Setup Program."

6. Enter the correct time and date in the System Setup program's **Time** and **Date** settings.

7. Re-enter any system configuration information that is no longer displayed on the System Setup screens, and then exit the System Setup program.

8. To test the newly installed battery, power down and disconnect the system from its electrical source for at least an hour.

9. After an hour, connect the system to its electrical source and turn on the power.

10. Enter the System Setup program and if the time and date are still incorrect, replace the system board.
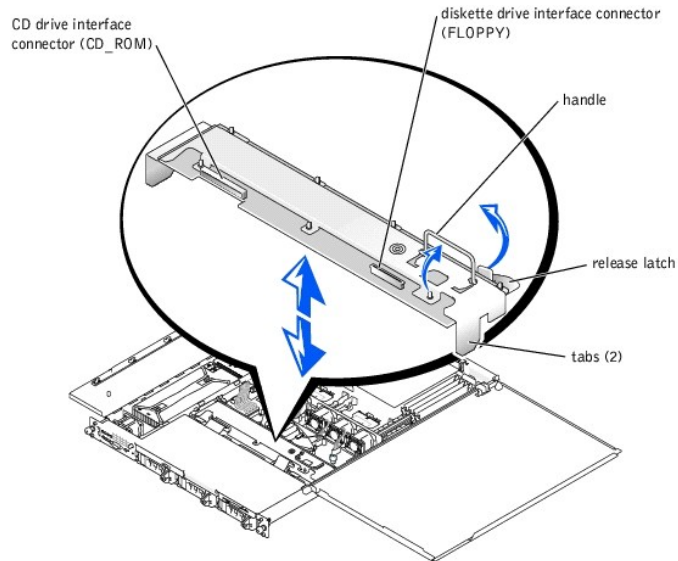
SCSI Backplane Board

The bottom of the SCSI backplane board provides three connectors for connecting up to three SCSI hard drives to the system board SCSI controller. Connectors for the CD drive and diskette drive are on the top of the backplane.

⚠️ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Removing the SCSI Backplane Board

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Pull each hard-drive carrier partially out of its slot, approximately 2.5 cm (1 inch).

Figure 4-21. SCSI Backplane Board

CD drive interface connector (CD_ROM)

diskette drive interface connector (FLOPPY)

handle

release latch

tabs (2)

5. Disconnect the diskette-drive interface cable from the FLOPPY connector on the backplane board. See Figure 4-21.

6. Disconnect the CD drive interface cable from the CD_ROM connector on the backplane board. See Figure 4-21.

7. Press the release latch in toward the backplane board and use the handle to pull the board out of its connector and up out of the chassis.

Installing the SCSI Backplane Board

1. Insert the SCSI backplane board into the chassis:

   a. Fit the metal tabs (one tab at each end of the backplane) into the slots in the chassis wall and lower the backplane into the chassis, ensuring that the CD and diskette drive interface cables are not caught under the backplane.

   b. Press down firmly over the handle to seat the backplane in its connector.

2. Pivot the release latch out into the securing slot in the chassis.

3. Connect the CD drive interface cable to the CD_ROM connector on the backplane board. See Figure 5-4.

4. Connect the diskette-drive interface cable to the FLOPPY connector on the backplane board. See Figure 5-4.

5. Press all installed hard drives firmly back into the SCSI connectors on the backplane.

6. Close the system covers. See "Closing the System Covers."

7. Reconnect the system and any attached peripherals to their electrical outlets, and turn them on.

8. Replace the optional front bezel, if applicable. See "Replacing the Bezel."
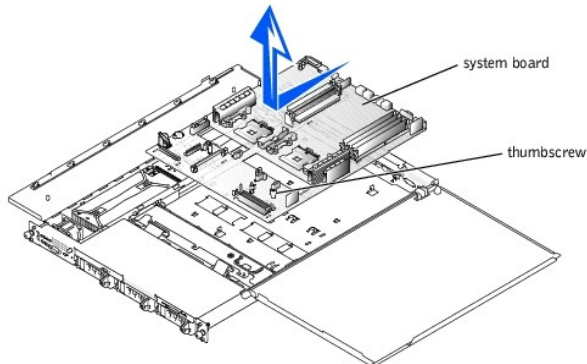

System Board

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

Removing the System Board

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Remove the SCSI backplane board. See "Removing the SCSI Backplane Board."

5. Disconnect all cables attached to the system board. See Figure 5-3.

   l Power and signal cables coming from the PDB (disconnect from the PS_PWR and PS_SIG connectors on the system board)

   l Control panel cable (disconnect from the FRONT_PANEL connector on the system board)

   l System and power-supply fan cables (6)

   l Any other cables attached to the system board, after recording their locations

6. Remove the fan bracket. See "Removing the Fan Bracket." (Do not remove the fans from the bracket.)

7. Remove all external peripheral cables from their connectors at the back of the system.

8. Remove any installed PCI expansion cards. See "Removing an Expansion Card."

9. Remove the PCI riser board assembly by pulling it straight up out of its connectors.

10. Remove the optional ROMB card and its backup battery, if they are installed. See "Removing a ROMB Card."

11. Remove the optional RAC, if one is installed. See Figure 5-3 for the location of the RAC connector ("EMBEDDED_REMOTE_ASSISTANT").

12. Remove the memory modules. See "Removing Memory Modules."

13. Remove the microprocessor and heat sink assembliies. See "Removing a Microprocessor."

14. Loosen the thumbscrew securing the system board to the chassis. See Figure 4-22.

Figure 4-22. System Board

15. Slide the system board toward the front of the chassis about 6.3 mm (0.25 inch).

16. Carefully lift the system board up and out of the chassis. Lift the board evenly, without twisting it. Take care not to catch or scrape the cables from the control panel, the PDB, and the rear fan.

Installing the System Board

1. Lower the system board into the chassis, left side first to protect the PDB, control panel, and rear fan cables. Press the system board evenly onto all the grounding tabs on the floor of the chassis.

2. Slide the system board toward the back of the chassis as far as it will go, about 6.3 mm (0.25 inch).

3. Tighten the thumbscrew to secure the system board.

4. Check to ensure that the system board jumpers are set to the same settings as the board you removed.

5. Install the microprocessor and heat-sink assemblies. See "Installing a Microprocessor."

6. Install the memory modules. See "Installing Memory Modules."

7. Install the optional RAC, if it was installed on the board you removed. See Figure 5-3 for the location of the RAC connector; see the RAC documentation for more information.

8. Install the optional ROMB card and its backup battery, if they were installed on the board you removed. See "Installing a ROMB Card."

9. Press the PCI riser board assembly firmly into its connectors.

10. Install the PCI expansion cards. See "Installing an Expansion Card."

11. Install the fan bracket assembly and connect the fans in the bracket to the system board. See "Installing the Fan Bracket."

12. Connect the remaining cables to the system board:

    l Power cable from rear fan to the FAN7 connector

    l Power signal cable from the PDB to the PS_SIG connector

    l Output power cable from the PDB to the PS_PWR connector

    l Control panel cable to the FRONT_PANEL connector

    l Any other cables you removed from the original board

13. Install the SCSI backplane board and any drives you removed or disconnected. See "Installing the SCSI Backplane Board."

14. Connect the external peripheral cables to their connectors at the back of the system.

15. Carefully check for any cables or components not installed or improperly seated in their connectors on the system board.

16. Close the system covers. See "Closing the System Covers."

17. Connect the power cable to the system and turn the system on.

18. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Internal SCSI Hard Drives

The three internal hard-drive bays accommodate up to three 1-inch SCSI hard drives that connect directly to the SCSI backplane board. No drive cables are necessary.

Before You Begin

SCSI hard drives are supplied in special drive carriers that fit in the hard-drive bays.

⬤ **NOTICE:** Before attempting to remove or install a drive while the system is running, see the documentation for the host adapter to ensure that the host adapter is configured correctly to support hot-pluggable drive removal and insertion.

🖉 **NOTE:** It is recommended that you use only drives that have been tested and approved for use with the SCSI backplane board.

You may need to use different programs than those provided with the operating system to partition and format SCSI hard drives.

⬤ **NOTICE:** Do not turn off or reboot your system while the drive is being formatted. Doing so can cause a drive failure.

When you format a high-capacity SCSI hard drive, allow enough time for the formatting to be completed. Long format times for these drives are normal. A 9-GB hard drive, for example, can take up to 2.5 hours to format.

Installing a SCSI Hard Drive

⬤ **NOTICE:** Hot-plug drive installation is not supported for systems without the optional ROMB card.

1. If the system does not have a ROMB card installed, shut down the system.

2. Remove the optional front bezel, if attached. See "Removing the Bezel."

3. Open the hard-drive handle and remove the drive blank (or the hard drive you intend to replace). See Figure 4-23.

Figure 4-23. Installing a SCSI Hard Drive
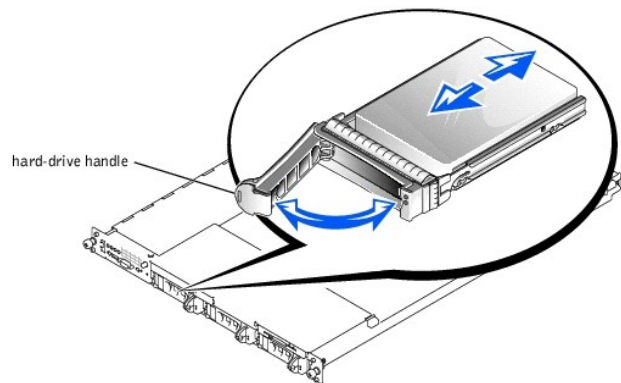
hard-drive handle

4. Insert the new hard drive into the drive bay. See Figure 4-23.

5. Close the hard-drive handle to lock the drive in place.

6. Replace the optional front bezel, if one was attached. See "Replacing the Bezel."

7. If the hard drive is a new drive, run the **SCSI Controllers** test in the system diagnostics. See "Running the System Diagnostics."

Removing a SCSI Hard Drive

⬤ **NOTICE:** Hot-plug drive installation is not supported for systems without the optional ROMB card.

1. If the system does not have a ROMB installed, shut down the system.

2. Remove the optional front bezel, if attached. See "Removing the Bezel."

3. For systems with a ROMB card, power down the hard-drive bay and wait until the SCSI hard-drive indicators on the drive carrier signal that the drive can be removed safely.

If the drive has been online, the green power on/fault indicator will flash as the drive is powered down. When both drive indicators are off, the drive is ready for removal.

4. Open the hard-drive handle to release the drive.

5. Slide the hard drive out until it is free of the drive bay.

6. Replace the optional front bezel, if one was attached. See "Replacing the Bezel."

External SCSI Hard Drives

Follow these general guidelines when connecting external SCSI hard drives to the external SCSI connector on the system's back panel or to a SCSI controller card.

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. If you are installing a SCSI controller card, install the card now. See "Installing an Expansion Card."

5. Connect the external SCSI devices to the external SCSI connector on the system's back panel or to the SCSI controller card.

   If you are attaching multiple external SCSI devices, daisy-chain the devices using the cables shipped with each device.

6. Close the system covers. See "Closing the System Covers."

7. Reconnect the system to an electrical outlet and turn it on.

8. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

9. Connect the external device(s) to electrical outlet(s) and turn them on.

10. Install any required SCSI device drivers. See "Installing and Configuring SCSI Drivers" in the User's Guide.

11. Test the SCSI devices. See "Running the System Diagnostics."

Configuring the Boot Device

If you plan to boot the system from a hard drive, the drive must be attached to the primary (or boot) controller. The device that the system boots from is determined by the boot order specified in the System Setup program. See "Using the System Setup Program."

Installing an External SCSI Tape Drive

This section describes how to configure and install an external SCSI tape drive with an add-in PCI controller card.

📝 **NOTE:** The integrated SCSI controller does not support mixed mode (one channel SCSI and one channel RAID). For this reason, in a system with RAID, Dell does not support an external tape drive connected to the external SCSI controller.

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. Ground yourself by touching an unpainted metal surface on the back of the system, unpack the drive and controller card, and configure the tape drive according to the tape drive documentation, based on the following guidelines:

   a. Each device attached to a SCSI host adapter must have a unique SCSI ID number. (Narrow SCSI devices use IDs 0 to 7; wide SCSI devices use IDs from 0 to 15).

      A SCSI tape drive is typically configured as SCSI ID 6.

   📝 **NOTE:** There is no requirement that SCSI ID numbers be assigned sequentially or that devices be attached to the cable in order by ID number.

   b. SCSI logic requires that the two devices at opposite ends of a SCSI chain be terminated and that all devices in between be unterminated. Therefore, you enable the tape drive's termination if it is the last device in a chain of devices (or sole device) connected to the SCSI controller.

5. Install the controller card in an expansion slot. See "Installing an Expansion Card."

6. Connect the tape drive's interface/output power cable to the connector on the controller card supplied with the tape drive.

7. Close the system covers. See "Closing the System Covers."

8. Reconnect the system and peripherals to their electrical outlets, and turn them on.

9. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

10. Perform a tape backup and verification test with the drive as instructed in the software documentation that came with the drive.

Installing a Diskette Drive

The optional diskette drive is installed in a carrier that slides into the peripheral bay. Perform the following steps to install a diskette drive.

⚠️ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if present. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. If a filler plate is installed in the drive bay, remove it now.

5. If the carrier and the drive were supplied separately, install the drive in the carrier. See Figure 4-24.

Figure 4-24. Installing a Diskette Drive in a Carrier
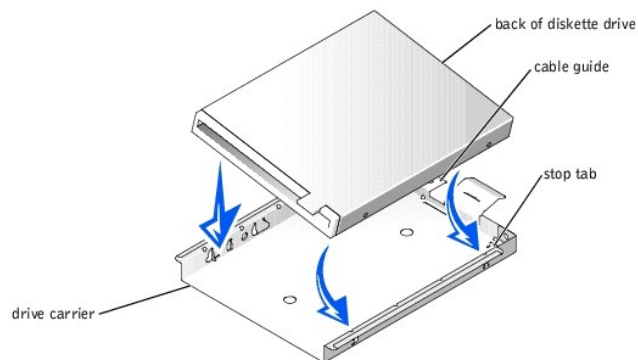
a. Fit the right edge of the diskette drive into the carrier tray, pressing the drive against the stop tab at the back of the carrier.

b. Lower the left edge of the drive into the carrier until the drive snaps into place.

c. Attach the end of the ribbon cable labeled "FLOPPY" to the back of the diskette drive, and then insert the cable through the slot in the cable guide at the back of the carrier.

6. Slide the drive into the peripheral bay until it is fully seated. See Figure 4-25.

Ensure that you do not damage the ribbon cable at the back of the drive.

Figure 4-25. Installing a Diskette Drive
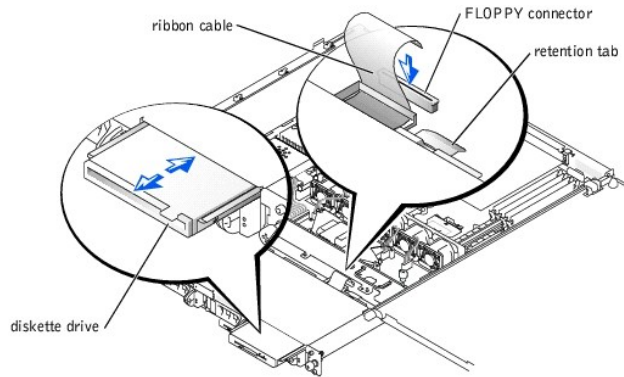
7. Connect the other end of the ribbon cable to the diskette drive connector on the SCSI backplane. See Figure 5-4.

8. Close the system covers. See "Closing the System Covers."

9. Reconnect the system and peripherals to their electrical outlets and turn them on.

10. Replace the optional front bezel, if applicable. See "Replacing the Bezel."


Installing a CD Drive

The optional CD drive is installed in a carrier that slides into the peripheral bay.

⚠ **CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the system, and protecting against electrostatic discharge.**

1. Remove the optional front bezel, if attached. See "Removing the Bezel."

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

3. Open the system covers. See "Opening the System Covers."

4. If a filler plate is installed in the drive bay, remove it now.

5. If the drive carrier and the drive were supplied separately, install the drive in the carrier. See Figure 4-26.

Figure 4-26. Installing a CD Drive in a Drive Carrier
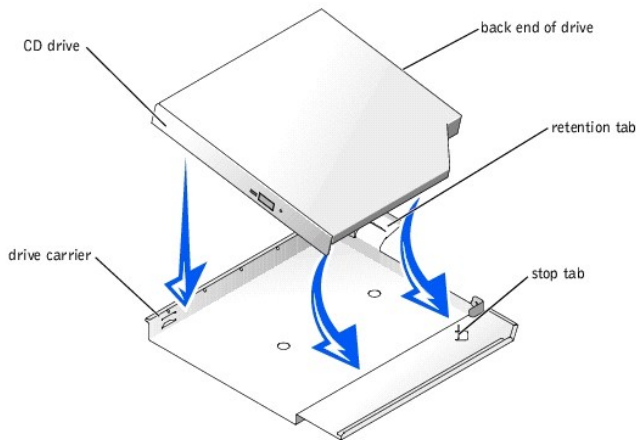
a. Match the back end of the drive with the back end of the carrier, which has a retention tab.

b. Fit the right edge of the CD drive into the carrier tray, pressing the drive firmly backward against the stop tab near the right rear corner of the carrier.

c. Lower the left side of the drive into the carrier until the drive snaps into place.

6. Slide the drive into the peripheral bay until it is fully inserted. See Figure 4-27.

Figure 4-27. Installing a CD Drive

retention tab

CD drive data cable

CD drive connector on SCSI backplane

CD drive
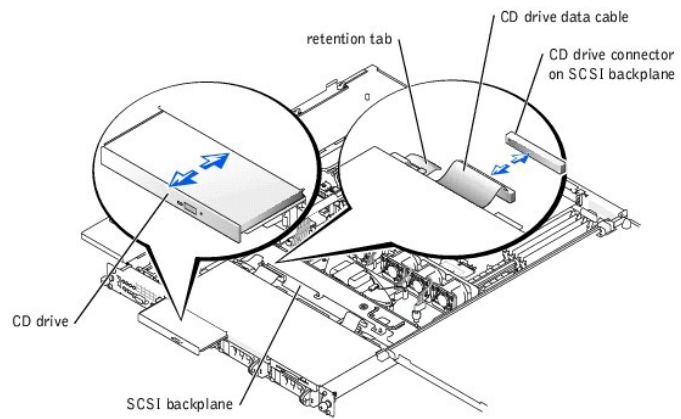
SCSI backplane

7. Connect the CD drive data cable to the CD drive and to the CD drive connector on the SCSI backplane. See Figure 5-4.

8. Close the system covers. See "Closing the System Covers."

9. Reconnect the system and peripherals to their electrical outlets and turn them on.

10. Replace the optional front bezel, if applicable. See "Replacing the Bezel."

Back to Contents Page

Using the System Setup Program

Dell™ PowerEdge™ 1750 Systems Service Manual

- Entering the System Setup Program
- System Setup Options
- System and Setup Password Features
- Disabling a Forgotten Password

After you set up your system, run the System Setup program to familiarize yourself with your system configuration and optional settings. Print the System Setup screens by pressing <Print Screen> or record the information for future reference.

You can use the System Setup program to:

- Change the system configuration stored in NVRAM after you add, change, or remove hardware
- Set or change user-selectable options—for example, the time or date
- Enable or disable integrated devices
- Correct discrepancies between the installed hardware and configuration settings

---

Entering the System Setup Program

1. Turn on or restart your system.
2. Press <F2> immediately after you see the following message:

   <F2> = System Setup

   If your operating system begins to load before you press <F2>, allow the system to finish booting, and then restart your system and try again.

   NOTE: To ensure an orderly system shutdown, see the documentation that accompanied your operating system.

Responding to Error Messages

You can enter the System Setup program by responding to certain error messages. If an error message appears while the system is booting, make a note of the message. Before entering the System Setup program, see "System Beep Codes" and "System Messages" for an explanation of the message and suggestions for correcting errors.

NOTE: After installing a memory upgrade, it is normal for your system to send a message the first time you start your system.

Using the System Setup Program

Table 6-1 lists the keys that you use to view or change information on the System Setup program screens and to exit the program.

Table 6-1. System Setup Program Navigation Keys

Keys	Action
Up arrow or <Shift><Tab>	Moves to the previous field.
Down arrow or <Tab>	Moves to the next field.
Spacebar, <+>, <−>, left and right arrows	Cycles through the settings in a field. In many fields, you can also type the appropriate value.
<Esc>	Exits the System Setup program and restarts the system if any changes were made.
<F1>	Displays the System Setup program's help file.

NOTE: For most of the options, any changes that you make are recorded but do not take effect until you restart the system.

System Setup Options

Main Screen

When you enter the System Setup program, the main System Setup program screen appears. See Figure 6-1.

Figure 6-1. Main System Setup Program Screen

```
          Dell Computer Corporation (www.dell.com) - PowerEdge 1750

 Intel® Xeon™ Processor              BIOS Version: XXX
 Processor Speed: 2.4 GHz            Service Tag : XXXXXX

  System Time .........................................08:15:45
  System Date .........................................Mon March 31, 2003

  Diskette Drive A: ...................................3.5 inch, 1.44 MB

  System Memory ......................................6144 MB ECC DDR
  Video Memory .......................................8 MB

  OS Install Mode ....................................OFF
  CPU Information ....................................<ENTER>

  Boot Sequence ......................................<ENTER>
  Hard-Disk Drive Sequence ...........................<ENTER>

  Integrated Devices .................................<ENTER>
  PCI IRQ Assignment  ................................<ENTER>
  PCI-X Slot Infomation ..............................<ENTER>

  Console Redirection ................................<ENTER>

  System Security ....................................<ENTER>

  Keyboard NumLock ...................................On
  Report Keyboard Errors .............................Report

  Asset Tag ..........................................XXXXX

 Up,Down Arrow to select │ SPACE,+,- to change │ ESC to exit │ F1=HELP
```

Table 6-2 lists the options and descriptions for the information fields that appear on the main System Setup program screen.

NOTE: The System Setup program defaults are listed under their respective options, where applicable.

Table 6-2. System Setup Program Options

Option	Description
System Time	Resets the time on the system's internal clock.
System Date	Resets the date on the system's internal calendar.
Diskette Drive A:	Displays a screen that allows you to select the type of diskette drive for your system.
System Memory	Displays the amount of system memory. This option has does not have user-selectable settings.
Video Memory	Displays the amount of video memory. This option does not have user-selectable settings.
Redundant Memory	Enables or disables the redundant memory feature. When enabled, all memory banks except for the last one are reported back to the operating system. The last bank is reserved for failover conditions. When disabled, all of the available system memory is reported to the operating system. **NOTE:** This feature can be enabled only if all memory banks are populated with memory modules of the same type.
OS Install Mode (**Off** default)	Determines the maximum amount of memory available to the operating system. On sets the maximum memory to 256 MB. Off makes all of the system memory available to the operating system. Some operating systems cannot install with more than 2 GB of system memory. Enable this option (On) during operating system installation and disable (Off) after installation.
CPU Information (Logical Processor Enabled default)	Displays information related to microprocessors (speed, cache size, and so on). Enable or disable Hyper-Threading technology by changing the setting of the Logical Processor option. Enable or disable memory pre-fetch by changing the setting of the **Sequential Memory Access** option. Default is **Enabled** on C1-, D1-, and M0-stepped processors.
Virtual Media (**Disabled** default)	Enables or disables the virtual media feature (when available). Options are **Enabled** and **Disabled**. The default is **Disabled** until the option becomes available.
Boot Sequence	Determines the order in which the system searches for boot devices during system startup. Available options can include the diskette drive, CD drive, hard drives, and network.
Hard-Disk Drive Sequence	Determines the order in which the system searches the hard drives during system startup. The selections depend on the hard drives installed in your system.
Integrated Devices	See "Integrated Devices Screen."
PCI IRQ Assignment	Displays a screen to change the IRQ assigned to each of the integrated devices on the PCI bus, and any installed expansion cards that require an IRQ.

PCI Slot Information	Displays a menu of selectable fields. Selecting any of the fields displays the following information for the PCI bus you selected:
	
	    l Occupied or unoccupied
	    l For occupied slots, the operating frequency and mode of the slots (PCI or PCI-X)
	    l For unoccupied slots, the maximum operating frequency and the capable operating mode of the slots

Console Redirection	See "Console Redirection Screen."
System Security	Displays a screen to configure the system password and setup password features. See "Using the System Password" and "Using the Setup Password" for more information.
Keyboard NumLock	Determines whether your system starts up with the **NumLock** mode activated on 101- or 102-key keyboards (does not apply to 84-key keyboards).
Report Keyboard Errors	Enables or disables reporting of keyboard errors during the POST. Enable this option for host systems that have keyboards attached. Select **Do Not Report** to suppress all error messages relating to the keyboard or keyboard controller during POST. This setting does not affect the operation of the keyboard itself if a keyboard is attached to the system.

Asset Tag	Displays the customer-programmable asset tag number for the system if an asset tag number has been assigned.

Integrated Devices Screen

Table 6-3 lists the options and descriptions for the information fields that appear on the **Integrated Devices** screen.

Table 6-3. Integrated Devices Screen Options

Option	Description
Embedded RAID Controller	Selects between **RAID**, **SCSI**, or **Off**. The configurable options vary, depending on whether the optional ROMB is installed. l With the ROMB installed — Select either **RAID Enabled**, **SCSI Enabled**, or **Off**. l Without the ROMB installed — Select either **SCSI** or **Off**.
IDE Controller	Enables the integrated IDE CD controller. When set to **Auto**, each channel of the integrated IDE controller is enabled if IDE devices are attached to the channel and an external IDE controller is not detected. Otherwise, the channel is disabled.
Diskette Controller (**Auto** default)	Enables or disables the system's diskette drive controller. When **Auto** is selected, the system turns off the controller when necessary to accommodate a controller card installed in an expansion slot. You can also configure the drive as read-only. When using the read-only setting, the drive cannot be used to write to a disk.
USB Controller (**On with BIOS support** default)	Enables or disables the system's USB ports. Options are **On with BIOS support**, **On without BIOS support**, or **Off**. Disabling the USB ports makes system resources available for other devices.
Embedded Gb NIC 1 and NIC 2	Enables or disables the system's integrated NICs. Options are **Enabled** and **Disabled**.
NIC 1 PXE	Enables or disables the integrated NIC 1 PXE support. Options are **Enabled** and **Disabled**. PXE support allows the system to boot from the network. Changes take effect after the system reboots.
NIC 2 PXE	Enables or disables the integrated NIC 2 PXE support. Options are **Enabled** and **Disabled**. PXE support allows the system to boot from the network. Changes take effect after the system reboots.
MAC Address	Displays the MAC address for the integrated Gb NIC. This field does not have user-selectable settings.
Serial Port (**Auto** default)	Serial port options are **COM1**, **COM3**, **Auto**, and **Off**. When the serial port is set to **Auto**, the integrated port automatically maps to the next available port. The serial port attempts to use COM1 first, and then COM3. If both addresses are in use for a specific port, the port is disabled. If you set the serial port to **Auto** and add an expansion card with a port configured to the same designation, the system automatically remaps the integrated port to the next available port designation that shares the same IRQ setting. If you set the serial port to **Off**, the system automatically remaps the integrated port to the RAC.
Speaker (**On** default)	Sets the integrated speaker **On** or **Off**. A change to this option takes effect immediately (rebooting the system is not required).

Console Redirection Screen

Table 6-4 lists the options and descriptions for the information fields that appear on the **Console Redirection** screen. For more information about using console redirection, see "Using Console Redirection" in the *User's Guide.*

Table 6-4. Console Redirection Screen Options

Option	Description
Console Redirection (**Off** default)	Sets the console redirection feature to **On** or **Off**.
Remote Terminal Type (**VT 100/VT 220** default)	Select either **VT 100/VT 220** or **ANSI**.
Redirection After Boot (**Enabled** default)	Enables or disables console redirection after your system restarts.

System Security Screen

Table 6-5 lists the options and descriptions for the information fields that appear on the **System Security** screen.

Table 6-5. System Security Screen Options

Option	Description
System Password	Displays the current status of your system's password security feature and allows you to assign and verify a new system password. **NOTE:** See "Using the System Password" for instructions on assigning a system password and using or changing an existing system password.
Setup Password	Restricts access to the System Setup program in the same way that you restrict access to your system using the system password feature. **NOTE:** See "Using the Setup Password" for instructions on assigning a setup password and using or changing an existing setup password.

Password Status	Setting the **Setup Password** option to **Enabled** prevents the system password from being changed or disabled at system start-up. To *lock* the system password, assign a setup password in the **Setup Password** option and then change the **Password Status** option to **Locked**. In this state, you cannot change the system password using the **System Password** option and cannot be disabled at system start up by pressing <Ctrl><Enter>. To *unlock* the system password, enter the setup password in the **Setup Password** field and then change the **Password Status** option to **Unlocked**. In this state, you can disable the system password at system start up by pressing <Ctrl><Enter> and then change the password using the **System Password** option.
Extended Security	When a system password is entered, setting the **Extended Security** option to **Enabled** locks all keys on the keyboard during BIOS POST, except for the <F2> key. Pressing the <F2> key during BIOS POST displays a password prompt that allows 20 seconds for a valid entry before continuing to boot the operating system.
Power Button	Turns system's power off and on. - If you turn off the system using the power button and the system is running an ACPI-compliant operating system, the system can perform an orderly shutdown before power is turned off. - If the system is not running an ACPI-compliant operating system, power is turned off immediately after the power button is pressed. The button is enabled in the System Setup program. When disabled, the button can only turn on system power.
NMI Button	**NOTICE:** Use the NMI button only if directed to do so by qualified support personnel or by the operating system's documentation. Pressing this button halts the operating system and displays a diagnostic screen. Sets the NMI feature **On** or **Off**.

Exit Screen

After you press <Esc> to exit the System Setup program, the **Exit** screen displays the following options:

- Save Changes and Exit

- Discard Changes and Exit

- Return to Setup

System and Setup Password Features

⬤ **NOTICE:** The password features provide a basic level of security for the data on your system. If your data requires more security, use additional forms of protection, such as data encryption programs.

⬤ **NOTICE:** Anyone can access the data stored on your system if you leave the system running and unattended without having a system password assigned or if you leave your system unlocked so that someone can disable the password by changing a jumper setting.

The system is shipped without the system password feature enabled. If system security is a concern, operate the system only with system password protection.

To change or delete an existing password, you must know the password. See "Deleting or Changing an Existing System Password." If you forget the password, you cannot operate the system or change settings in the System Setup program until a trained service technician changes the password jumper setting to disable the passwords, and erases the existing passwords. See "Disabling a Forgotten Password."

Using the System Password

After a system password is assigned, only those who know the password have full use of the system. When the **System Password** option is set to **Enabled**, the system prompts you for the system password after the system starts.

Assigning a System Password

Before you assign a system password, enter the System Setup program and check the **System Password** option.

When a system password is assigned, the setting shown for the **System Password** option is **Enabled**. If the setting shown for the **Password Status** is **Unlocked**, you can change the system password. If the **Password Status** option is **Locked**, you cannot change the system password. When the system password feature is disabled by a jumper setting, the system password is **Disabled**, and you cannot change or enter a new system password.

When a system password is not assigned and the password jumper on the system board is in the enabled (default) position, the setting shown for the **System Password** option is **Not Enabled** and the **Password Status** field is **Unlocked**. To assign a system password:

1. Verify that the **Password Status** option is set to **Unlocked**.

2. Highlight the **System Password** option and press <Enter>.

3. Type your new system password.

   You can use up to 32 characters in your password.

   As you press each character key (or the spacebar for a blank space), a placeholder appears in the field.

   The password assignment is not case-sensitive. However, certain key combinations are not valid. If you enter one of these combinations, the system beeps. To erase a character when entering your password, press <Backspace> or the left-arrow key.

   📝 **NOTE:** To escape from the field without assigning a system password, press <Enter> to move to another field, or press <Esc> at any time prior to completing step 5.

4. Press <Enter>.

5. To confirm your password, type it a second time and press <Enter>.

   The setting shown for the **System Password** changes to **Enabled**. Exit the System Setup program and begin using your system.

6. Either reboot your system now for your password protection to take effect or continue working.

   ![note icon] **NOTE:** Password protection does not take effect until you reboot the system.

Using Your System Password to Secure Your System

![note icon] **NOTE:** If you have assigned a setup password (see "Using the Setup Password"), the system accepts your setup password as an alternate system password.

When the **Password Status** option is set to **Unlocked**, you have the option to leave the password security enabled or to disable the password security.

To leave the password security enabled:

1. Turn on or reboot your system by pressing <Ctrl><Alt><Del>.

2. Press <Enter>.

3. Type your password and press <Enter>.

To disable the password security:

1. Turn on or reboot your system by pressing <Ctrl><Alt><Del>.

2. Press <Ctrl><Enter>.

When the **Password Status** option is set to **Locked** whenever you turn on your system or reboot your system by pressing <Ctrl><Alt><Del>, type your password and press <Enter> at the prompt.

After you type the correct system password and press <Enter>, your system operates as usual.

If an incorrect system password is entered, the system displays a message and prompts you to re-enter your password. You have three attempts to enter the correct password. After the third unsuccessful attempt, the system displays an error message showing the number of unsuccessful attempts and that the system has halted and will shut down. This message can alert you to an unauthorized person attempting to use your system.

Even after you shut down and restart the system, the error message continues to be displayed until the correct password is entered.

![note icon] **NOTE:** You can use the **Password Status** option in conjunction with the **System Password** and **Setup Password** options to further protect your system from unauthorized changes.

Deleting or Changing an Existing System Password

1. When prompted, press <Ctrl><Enter> to disable the existing system password.

   If you are asked to enter your setup password, contact your network administrator.

2. Enter the System Setup program by pressing <F2> during POST.

3. Select the **System Security** screen field to verify that the **Password Status** option is set to **Unlocked**.

4. When prompted, type the system password.

5. Confirm that **Not Enabled** is displayed for the **System Password** option.

   If **Not Enabled** is displayed for the **System Password** option, the system password has been deleted. If **Enabled** is displayed for the **System Password** option, press the <Alt><b> key combination to restart the system, and then repeat steps 2 through 5.

Using the Setup Password

Assigning a Setup Password

You can assign (or change) a setup password only when the **Setup Password** option is set to **Not Enabled**. To assign a setup password, highlight the **Setup Password** option and press the <+> or <-> key. The system prompts you to enter and verify the password. If a character is illegal for password use, the system beeps.

![note icon] **NOTE:** The setup password can be the same as the system password. If the two passwords are different, the setup password can be used as an alternate system password. However, the system password cannot be used in place of the setup password.

You can use up to 32 characters in your password.

As you press each character key (or the spacebar for a blank space), a placeholder appears in the field.

The password assignment is not case-sensitive. However, certain key combinations are not valid. If you enter one of these combinations, the system beeps. To erase a character when entering your password, press <Backspace> or the left-arrow key.

After you verify the password, the **Setup Password** setting changes to **Enabled**. The next time you enter the System Setup program, the system prompts you for the setup password.

A change to the **Setup Password** option becomes effective immediately (restarting the system is not required).

Operating With a Setup Password Enabled

If **Setup Password** is set to **Enabled**, you must enter the correct setup password before you can modify most of the System Setup options. When you start the System Setup program, the program prompts you to enter a password.

If you do not enter the correct password in three attempts, the system lets you view, but not modify, the System Setup screens—with the following exception: If **System Password** is not set to **Enabled** and is not locked through the **Password Status** option, you can assign a system password (however, you cannot disable or change an existing system password).

NOTE: You can use the **Password Status** option in conjunction with the **Setup Password** option to protect the system password from unauthorized changes.

Deleting or Changing an Existing Setup Password

1. Enter the System Setup program and select the **System Security** option.

2. Highlight the **Setup Password** option, press <Enter> to access the setup password window, and press <Enter> twice to clear the existing setup password.

   The setting changes to **Not Enabled**.

3. If you want to assign a new setup password, perform the steps in "Assigning a Setup Password."

Disabling a Forgotten Password

You can use the password jumper on the system board to enable or disable the password features or clear any password(s) currently in use.

To disable a forgotten system password or setup password, perform the following steps.

CAUTION: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.

1. Open the system covers. See "Opening the System Covers."

2. See Figure 5-2 for the location of the password jumper (labeled "PASSWD") on the system board.

3. Remove the jumper plug from the PASSWD jumper.

4. Close the system covers. See "Closing the System Covers."

5. Reconnect the system to an electrical outlet and turn it on.

   The existing passwords are not disabled (erased) until the system boots with the PASSWD jumper plug removed. However, before you assign a new system and/or setup password, you must reinstall the jumper plug.

   NOTE: If you assign a new system and/or setup password with the jumper plug still removed, the system disables the new password(s) the next time it boots.

6. Repeat step 1.

7. Install the jumper plug on the PASSWD jumper.

8. Close the system covers, and then reconnect the system and peripherals to their electrical outlets and turn them on.

9. Assign a new system and/or setup password.

   To assign a new passwords using the System Setup program, see "Assigning a System Password" in the *User's Guide*.

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