

Dell® Latitude® CP and CPi

SERVICE MANUAL

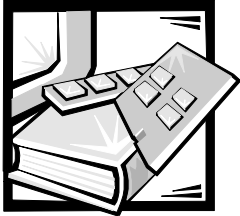
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Read This First

A prerequisite for using this manual to service Dell computer systems is a basic knowledge of IBM®-compatible PCs and prior training in IBM-compatible PC troubleshooting techniques. In addition to information provided in this manual and the *User's Guide* that came with the system, Dell provides the *Diagnostics and Troubleshooting Guide* for troubleshooting procedures and instructions on using the Dell diagnostics to test the computer system.

Warnings, Cautions, and Notes

Throughout this manual, there may be blocks of text printed in bold type or in italic type. These blocks are warnings, cautions, and notes, and they are used as follows:



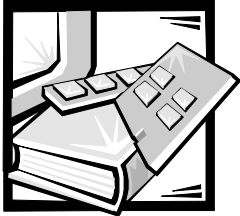
WARNING: A WARNING indicates the potential for bodily harm and provides instructions for how to avoid the problem.



CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and provides instructions for how to avoid the problem.



NOTE: A NOTE provides helpful information about using the computer system.



CHAPTER 1

System Overview

This chapter provides an overview of the features and specifications of the Dell[®] Latitude[®] CP and CPI portable computers.

System Features

In addition to the standard features found in a Dell portable computer, the Latitude CP and CPI include the following new features:

- A Mobile Intel[®] Pentium[®] II microprocessor 233, 266, or 300 MHz or an Intel Pentium microprocessor with MMX technology 166, 200, or 233 MHz, with 32 KB of internal cache.
- A 512-KB or 256-KB pipelined-burst SRAM external cache.
- PCI bus architecture that increases system performance.
- A PC Card controller that supports the CardBus standard for 32-bit data transfer.
- Support for up to 128 MB of system memory.
- A CD-ROM drive for use in the modular bay.
- Support for a hard-disk drive in the modular bay.
- A 13.3-inch XGA (1024 x 768) active-matrix (TFT) color display, a 12.1-inch SVGA (800 x 600) active-matrix (TFT) color display, or a 12.1-inch SVGA (800 x 600) HPHC dual-scan (STN) color display.
- A Sound Blaster Pro-compatible integrated audio controller with voice and music functions.
- Support for a zoom video PC Card in the upper PC Card connector.
- Jacks for connecting external speakers or headphones, a microphone, and record/playback devices to the computer.
- Software wavetable support and SRS 3-D audio control.
- A lithium ion battery with a built-in charge gauge and ExpressCharge technology that charges the battery in about an hour (when the computer is in suspend mode [or standby mode for the Microsoft[®] Windows[®] 98 operating system] or turned off).
- Support for a battery in the modular bay. When used with the computer's main battery, a second battery doubles battery operating time.

- Two power management modes—suspend mode (or standby mode in Windows 98) and suspend-to-disk mode—that help you conserve battery power.
- Automatic thermal management that slows the microprocessor or starts a small fan when necessary.
- An infrared port compatible with IrDA 1.1 (Fast IR) and 1.0 standards, and a USB connector that supports stand-alone and hub devices.
- A PC Card slot with two connectors that support 5-V and 3.3-V PC Cards.
- A BIOS that resides in flash memory and that can be upgraded by diskette if required.
- A PS/2-compatible touch pad with full mouse functionality.
- Hardware and software support for the Dell Latitude C/Port Advanced Port Replicator (APR) and Latitude C/Dock Expansion Station.

For a complete list of system features, see “Technical Specifications” found later in this chapter.

Physical Description

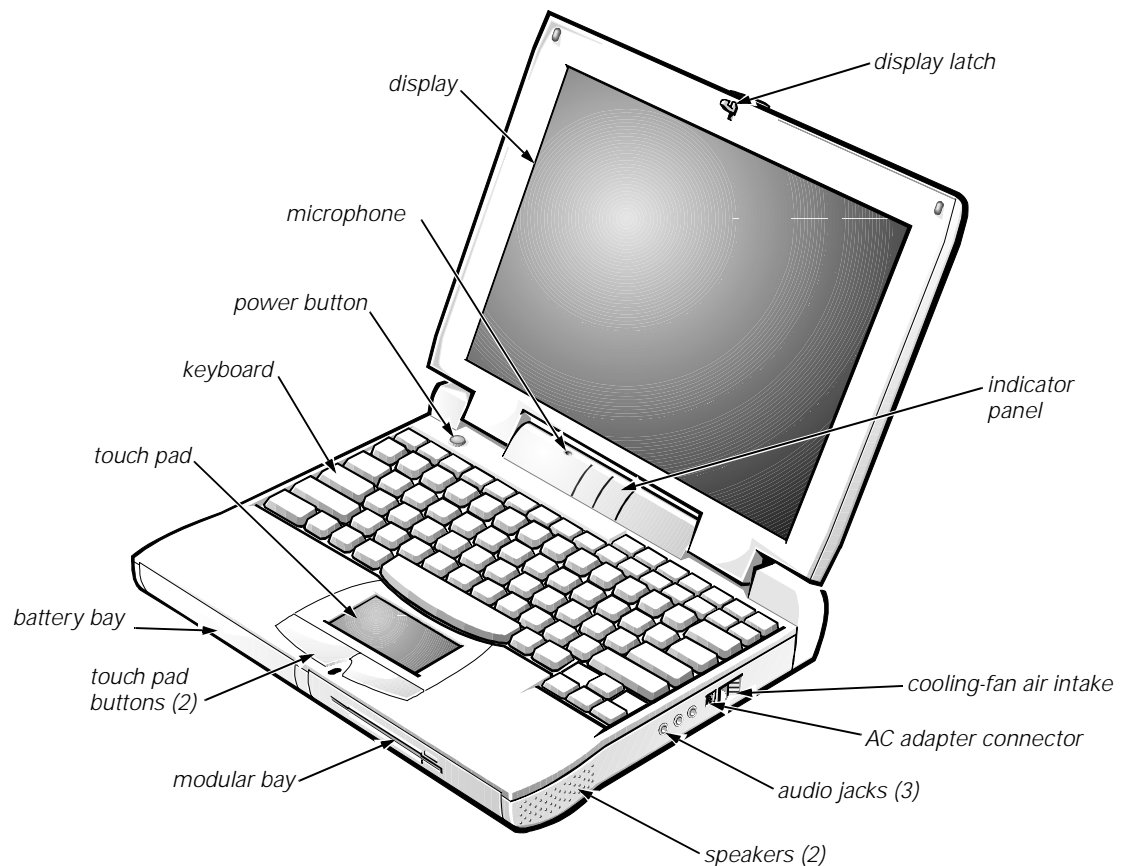


Figure 1-1. Front View of the Computer

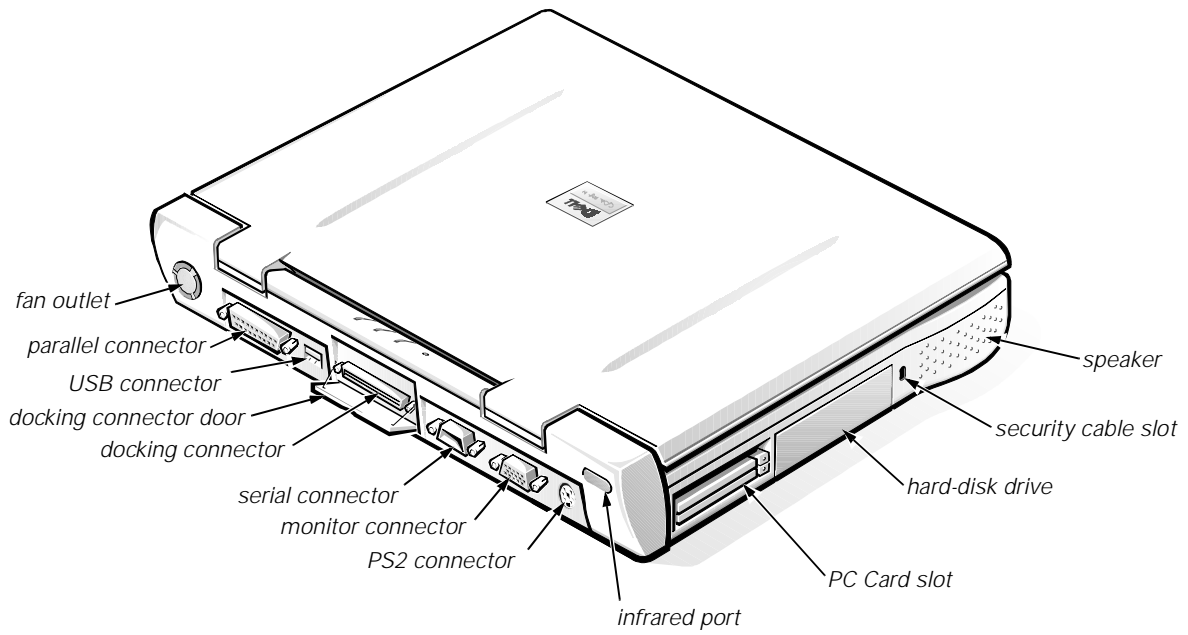


Figure 1-2. Back View of the Computer

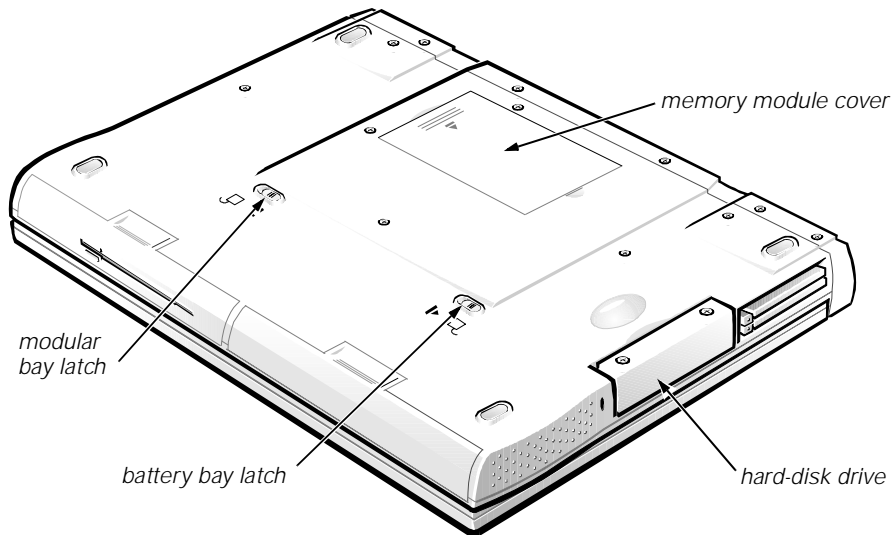


Figure 1-3. Bottom View of the Computer

Indicator Panel

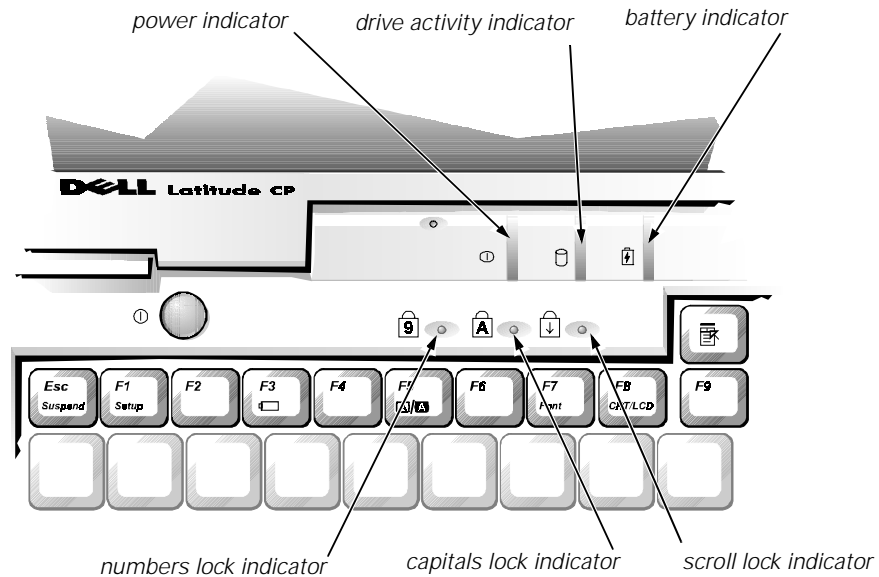


Figure 1-4. Indicator Panel

The Latitude CP or CPi computer has three indicators on the display assembly's indicator panel and three on the keyboard assembly. The following subsections describe the functions of these indicators.

Power Indicator

The power indicator is a green LED. After the computer is turned on, the power indicator lights up constantly to indicate that the computer is receiving stable power. If the power indicator is off, the computer is either in suspend mode (or standby mode for Windows 98), suspend-to-disk mode, or off.

Drive Activity Indicator

The drive activity indicator is a green LED. The indicator lights up when data is being transferred to or from the hard-disk drive, or to or from a diskette drive, CD-ROM drive, or other device installed in the modular bay.

Battery Indicator

The battery indicator displays the following conditions:

- The indicator turns green while the AC adapter is fast-charging. During the normal charging cycle, the indicator remains on without blinking. After the battery is fully charged, the battery indicator blinks green to indicate that the AC adapter is providing a maintenance (trickle) charge to keep the battery at full capacity.

- The system supports two low-battery warning codes:

The first low-battery warning occurs when the main battery has 15 minutes or less of charge remaining. The amber battery indicator blinks once per second.

The second low-battery warning occurs when the main battery has 5 minutes or less of charge remaining. The amber battery indicator lights up without blinking. If no user activity occurs within 15 seconds, the system automatically enters suspend (or standby mode for Windows 98) or suspend-to-disk.

- Several error codes indicate temporary or fatal battery conditions. Refer to "Battery Failure Codes" in Chapter 3 for a listing of these codes.

Keyboard Indicators

- The keyboard controls the operation of the numbers lock (Num Lock) indicator, the capitals lock (Caps Lock) indicator, and the Scroll Lock indicator, all of which are visible through openings at the top of the keyboard. These indicators are associated with the <Num Lock> key, the <Caps Lock> key, and the <Scroll Lock> key, respectively; when lit, the LEDs indicate the active state of their respective keys. These indicators also blink to indicate error codes. Refer to "POST Error Codes" in Chapter 3 for a listing of these codes.

Controlling Computer Power

Pressing the power button on the Latitude CP or CPi computer, C/Dock Expansion Station, or the C/Port APR initiates a change from the current power state to a different state. The protocols for the power state changes are as follows:

- If the computer is off (power indicator is off) and the display is open, pressing the power button initiates a boot operation.
- If the computer is on (power indicator is on) and the display is open but off, pressing the power button causes the display to turn on.
- If the computer is in suspend mode (or standby mode for Windows 98) (power indicator is off), pressing the power button turns on the computer. (A modem ring or system alarm event will also turn on the computer.)
- Pressing the power button for 4 seconds causes the computer to power down.
- If the computer is in suspend mode (or standby mode for Windows 98) (power indicator is off), the display is closed, and no external monitor is attached, pressing the power button on the Latitude C/Port APR or C/Dock Expansion Station has no effect on the power state. The computer remains in suspend mode (or standby mode for Windows 98).
- If the computer is in suspend-to-disk mode and the display is open or an external monitor is connected, pressing the power button causes the computer to initiate the resume-from-disk operation.

Interrupt Assignments

Table 1-1. Interrupt Assignments

IRQ Line	Used/Available
IRQ0	Generated by the system timer
IRQ1	Generated by the keyboard controller to signal that the keyboard output buffer is full
IRQ2	Generated internally by the interrupt controller to enable IRQ8 through IRQ15
IRQ3	Available for use by a PC Card unless the built-in serial port or infrared port is configured for COM2 (the default) or COM4
IRQ4	Available for use by a PC Card unless the built-in serial port or infrared port is configured for COM1 (the default) or COM3
IRQ5	Available for use by the audio controller
IRQ6	Generated by the diskette drive controller to indicate that the diskette drive requires the attention of the microprocessor
IRQ7	Available for use by a PC Card or audio controller if the built-in parallel port is disabled
IRQ8	Generated by the system I/O controller's RTC
IRQ9	Generated by the video controller
IRQ10	Available for use by a PC Card or audio controller unless the C/Port APR or C/Dock Expansion Station is attached
IRQ11	Generated by the USB and PC Card controllers; available for use by a PC Card
IRQ12	Generated by the keyboard controller to indicate that the output buffer of the integrated touch pad or external PS/2 mouse is full
IRQ13	Reserved for use by the internal coprocessor
IRQ14	Generated by the hard-disk drive to indicate that it requires the attention of the microprocessor
IRQ15	Generated by the CD-ROM drive in the modular bay to indicate that the drive requires the attention of the microprocessor

Technical Specifications

Table 1-2. Technical Specifications

Microprocessor	
Microprocessor:	
Latitude CPi D300XT	
Latitude CPi D266XT	
Latitude CPi D233ST	Mobile Intel Pentium II microprocessor 300, 266, or 233 MHz
Latitude CP M233XT	
Latitude CP M233ST	
Latitude CP M233SD	
Latitude CP M166ST	Intel Pentium microprocessor with MMX technology 233 or 166 MHz
Bus architecture	PCI
Internal cache memory	32 KB
External cache memory:	
Latitude CPi D300XT	
Latitude CPi D266XT	
Latitude CPi D233ST	
Latitude CP M233XT	
Latitude CP M233ST	
Latitude CP M233SD	512 KB pipelined-burst SRAM
Latitude CP M166ST	256 KB pipelined-burst SRAM
Math coprocessor	internal to the microprocessor
Chip Set and Bus	
System chip set:	
Latitude CPi D300XT	
Latitude CPi D266XT	
Latitude CPi D233ST	Intel 440BX PCiset
Latitude CP M233XT	
Latitude CP M233ST	
Latitude CP M233SD	
Latitude CP M166ST	Intel Mobile 430TX PCiset
Microprocessor data bus width. . .	64 bits
DRAM bus width	64 bits
Address bus width	32 bits
Security EEPROM	256 bytes
Flash EPROM	2 Mbits
Local bus	66 MHz
PCI bus	33 MHz

Table 1-2. Technical Specifications (continued)

PC Card	
PC Card controller	Texas Instruments PCI1131 CardBus controller
PC Card connectors	two (supports type I and type II cards in any combination; supports type III cards only in the lower connector) ¹
Cards supported	3.3-V and 5-V cards
PC Card connector size	68 pins
Data width (maximum):	
PCMCIA	16 bits
CardBus	32 bits
Memory	
Memory module sockets	two
Memory module type and capacities ²	16-, 32-, and 64-MB 3.3-V EDO SODIMMs
Standard RAM	one 16-MB memory module or one 32-MB memory module
Maximum RAM	128 MB
Memory access time:	
tRAC	60 ns
tCAC	15 ns
BIOS address	F000:0000–F000:FFFF
Connectors	
Serial (DTE)	one 9-pin connector; 16550-compatible, 16-byte buffer
Parallel	one 25-hole connector; unidirectional, bidirectional, or ECP
Video	one 15-hole connector
PS/2	one 6-hole mini-DIN (does not support more than one device at a time)

¹ On systems using the Microsoft Windows 95 or Windows 98 operating system, a zoom video card can be used only in the upper connector. The Microsoft Windows NT[®] 4.0 operating system does not support zoom video.

² The Latitude CP and CPi do not support memory modules from previous models of Dell portable computers, such as the Latitude XP, XPi, XPi CD, and LM.

Table 1-2. Technical Specifications (continued)

Connectors (continued)	
Infrared	one port compatible with IrDA Standards 1.1 (Fast IR) and 1.0 (Slow IR)
Audio	microphone-in; line-in/audio-in; headphones/speakers
Docking	one 200-pin connector for Latitude C/Port APR or C/Dock Expansion Station
Universal Serial Bus	one four-pin connector
Audio	
Audio controller	Crystal 4237B
Audio type	Sound Blaster Pro-compatible voice and music functions
Stereo	16 bit (analog-to-digital and digital-to-analog)
FM music synthesizer	20-voice, 72-operator
Interfaces:	
Internal	ISA bus
External	stereo line-in/audio-in minijack; microphone-in minijack; headphones/speakers-out minijack
Speakers	two 8-ohm speakers
Speaker/headphones amplifier . . .	1 W into 8 ohms stereo
Controls	volume can be controlled with key combinations, software application menus, the Speaker window in the Dell Control Center, or the System Setup program
Video	
Video type	hardware-accelerated, 128-bit PCI
Video controller	NeoMagic 2160
Integrated video memory	2 MB

Table 1-2. Technical Specifications (continued)

Display (Dell Latitude CPi D233ST, CP M233ST, and CP M166ST)	
Type	active-matrix color (TFT)
Dimensions (active area):	
Height	184.5 mm (7.26 inches)
Width	246.0 mm (9.68 inches)
Diagonal	307.5 mm (12.10 inches)
Maximum resolution/colors	800 x 600 pixels; 262,144 colors
Response time (typical)	50 ms
Operating angle	0° (closed) to 180°
Dot pitch	0.31 mm
Power consumption:	
Panel (typical)	0.7 W
Backlight	1.6 or 2.4 W
Controls	brightness can be controlled with key combinations, the Display window in the Dell Control Center, or the System Setup program
Display (Dell Latitude CPi D300XT, CPi D266XT, and CP M233XT)	
Type	active-matrix color (TFT)
Dimensions (active area):	
Height	202.8 mm (7.98 inches)
Width	270.3 mm (10.64 inches)
Diagonal	337.8 mm (13.3 inches)
Maximum resolution/colors	1024 x 768 pixels; 262,144 colors
Response time (typical)	50 ms
Operating angle	0° (closed) to 180°
Dot pitch	0.26 mm
Power consumption:	
Panel (typical)	1.7 W
Backlight	2.6 W
Controls	brightness can be controlled with key combinations, the Display window in the Dell Control Center, or the System Setup program

Table 1-2. Technical Specifications (continued)

Display (Dell Latitude CP M233SD)	
Type	HPHC dual-scan color (STN)
Dimensions (active area):	
Height	184.5 mm (7.26 inches)
Width	246.0 mm (9.68 inches)
Diagonal	307.5 mm (12.10 inches)
Maximum resolution/colors	800 x 600 pixels; 262,144 colors
Response time (typical)	150 ms
Operating angle	0° (closed) to 180°
Dot pitch	0.31 mm
Power consumption:	
Panel (typical)	0.63 W
Backlight	3.2 W
Controls	brightness and contrast can be controlled with key combinations, the Display window in the Dell Control Center, or the System Setup program
Touch Pad	
Interface	PS/2-compatible
X/Y position resolution (graphics table mode)	20 points/mm (500 points/inch)
Size:	
Thickness	2.5 mm (0.10 inch) at highest component
Width (sensor-active area)	61.8 mm (2.43 inches) at bottom; 58.6 mm (2.31 inches) at top
Height	48.8-mm (1.92-inches) rectangle
Weight	8 g (0.28 oz) ± 0.5 g (0.02 oz)
Power:	
Supply voltage	5 V ± 10%
Supply current	4 mA (maximum operating)

Table 1-2. Technical Specifications (continued)

Keyboard	
Number of keys	87 (U.S., Canada, Korea, Thailand, and locations that use traditional Chinese); 88 (Europe); 90 (Japan)
Key travel	3.0 mm + 0.5 mm/-0.2 mm (0.12 inch + 0.02 inch/-0.008 inch)
Key spacing	19.05 mm ± 0.3 mm (0.75 inch ± 0.012 inch)
Layout	QWERTY, AZERTY, Kanji
Battery	
Type	smart lithium ion
Dimensions:	
Height	21.5 mm (0.83 inch)
Depth	88.5 mm (3.48 inches)
Width	139.0 mm (5.47 inches)
Weight	0.4 kg (0.88 lb)
Voltage	16.8 VDC
Capacity	43 WH
Charge time (approximate): ³	
Computer on	75 minute
Computer off or in suspend mode (or in standby mode for Windows 98)	1 hour
Life span (approximate) ³	500 discharge/charge cycles; 2000 partial discharge/charge cycles
Temperature range:	
Charge	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)

³ *Battery performance features such as charge time and life span can vary according to the conditions under which the computer and battery are used.*

Table 1-2. Technical Specifications (continued)

AC Adapter	
Input voltage	90 to 135 VAC and 164 to 264 VAC
Input current (maximum)	3.5 A
Input frequency	47 to 63 Hz
Output current	4.5 A (maximum at 4-sec pulse); 3.51 A (continuous)
Rated output voltage	20.0 VDC
Height	27.9 mm (1.09 inches)
Width	58.4 mm (2.29 inches)
Depth	133.3 mm (5.25 inches)
Weight (with cables)	0.4 kg (0.9 lb)
Temperature range:	
Operating	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)
Physical (Dell Latitude CPi D233ST, CP M233ST, and CP M166ST)	
Height	38.6 mm (1.52 inches)
Width	306.0 mm (12.05 inches)
Depth	241.0 mm (9.49 inches)
Weight ⁴	2.5 kg (5.6 lb)
Physical (Dell Latitude CPi D300XT, CPi D266XT, and CP M233XT)	
Height	44.1 mm (1.74 inches)
Width	306.8 mm (12.08 inches)
Depth	241.0 mm (9.49 inches)
Weight ⁵	2.8 kg (6.2 lb)

⁴ Weight shown is with a hard-disk drive, a battery in the battery bay, a diskette drive in the modular bay, and one memory module. Your computer might weigh more or less, depending on its configuration.

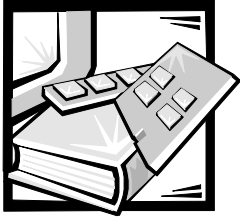
⁵ Weight shown is with a hard-disk drive, a battery in the battery bay, a diskette drive in the modular bay, and one memory module. Your computer might weigh more or less, depending on its configuration.

Table 1-2. Technical Specifications (continued)

Physical (Dell Latitude CP M233SD)	
Height	38.6 mm (1.52 inches)
Width	306.0 mm (12.05 inches)
Depth	241.0 mm (9.49 inches)
Weight ⁶	2.6 kg (5.8 lb)
Environmental	
Temperature:	
Operating	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)
Relative humidity (maximum):	
Operating	10% to 90% (noncondensing)
Storage	5% to 95% (noncondensing)
Maximum vibration:	
Operating	0.51 GRMS, using a random-vibration spectrum that simulates truck shipment
Storage	1.3 GRMS, using a random-vibration spectrum that simulates air/truck shipment
Maximum shock: ⁷	
Operating	152.4 cm/sec (60 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage	203.2 cm/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)
Altitude (maximum):	
Operating	-18 to 3048 m (-59 to 10,000 ft)
Storage	-18 to 10,600 m (-59 to 35,000 ft)

⁶ Weight shown is with a hard-disk drive, a battery in the battery bay, a diskette drive in the modular bay, and one memory module. Your computer might weigh more or less, depending on its configuration.

⁷ Measured with the hard-disk drive in head-parked position.



CHAPTER 2

Initial Procedures

This chapter describes initial procedures that can help you diagnose a computer problem. These procedures can often reveal the source of a problem or indicate the correct starting point for troubleshooting the computer. Dell recommends that you perform these procedures in the order presented here.

Initial User Contact

When you first contact a user who has a computer problem, ask the user to describe the problem and the conditions under which it occurs. A verbal description can often indicate the cause of a problem or indicate the appropriate troubleshooting procedure to use. After the user describes the problem, follow these steps:

- 1. Ask the user to back up any data on the hard-disk drive if the system's condition permits.**

See "Maintaining Your Computer" in the online *Dell Latitude CP and CPI User's Guide*.

- 2. Ask the user to try to duplicate the problem by repeating the operations he or she was performing at the time the problem occurred.**

Can the user duplicate the problem?

Yes. Proceed to step 3.

No. Proceed to the next section, "Visual Inspection."

- 3. Observe the user to determine whether he or she is making an error, such as typing an incorrect key combination or entering a command incorrectly.**

Is the problem a result of user error?

Yes. Instruct the user in the proper procedure, or direct him or her to the appropriate user documentation for a description of the correct procedure.

No. Proceed to the next section, "Visual Inspection."

Visual Inspection

The visual inspection consists of a quick inspection of the exterior of the computer and any attached peripherals, including making any necessary corrections. For information about the proper removal and installation of computer components, as instructed in the following procedures, see Chapter 4, "Removing and Replacing Parts."



CAUTION: Before you proceed with the visual inspection, ensure that the user has saved all open files and exited all open application programs if possible.

To perform a visual inspection, follow these steps:

- 1. Save any work in progress and close all open applications.**
- 2. Turn off any attached peripherals.**
- 3. Determine the present power state of the computer.**

Look at the indicators to determine which of the following conditions apply. Then turn off the computer, and take the actions listed for that condition:

- Power indicator is blinking.
An error occurred during system POST.
- Power indicator is off.
The system is either off or in suspend (or standby, for the Microsoft Windows 98 operating system) or suspend-to-disk mode.
- Power indicator is on.
The system is in the power-on state.
- Battery indicator is amber (steadily on or blinking slowly).
A low-battery warning occurred. Shut down the operating system; then replace the battery or connect the computer to AC power to charge the battery.
- Battery indicator is alternating between green and amber.
A temporary battery failure has occurred. Press the power button for 4 seconds to turn off the computer, and let the battery and computer cool to room temperature.
- Battery indicator is amber and blinking rapidly when the power switch is pressed or the AC adapter is connected to the computer.
A fatal battery condition exists. Press the power button for 4 seconds to turn off the computer, and then remove the battery or batteries from the system.
- All indicators remain off.
The computer is already turned off or in suspend-to-disk mode.

4. If the computer is docked in a C/Port Advanced Port Replicator (APR) or C/Dock Expansion Station, undock the computer.

See the *User's Guide* that came with the C/Port APR or C/Dock Expansion Station for detailed instructions on undocking the computer.

5. Verify that the exterior of the computer is free of obvious physical damage.

6. If the computer is operating from an AC adapter, verify the following:

- The AC adapter's AC power cable is connected to both the adapter and a power source.
- The AC adapter's DC power cable is properly connected to the computer's DC power input connector.
- The AC adapter and cables are free of obvious physical damage.
- The AC power adapter's green power indicator is on.



NOTE: If the computer's battery indicator flashes alternately green and amber while the computer is connected to AC power, disconnect the computer from AC power and move it to a cooler location. When the computer has cooled to room temperature, reconnect it to AC power and continue charging the battery. If the computer is not allowed to cool, the battery stops charging before it reaches full capacity.

7. If the computer is operating from battery power, remove the main battery assembly, verify that it is free of obvious physical damage, and then reinsert the battery assembly into the battery bay.

8. Remove the hard-disk drive, verify that it is free of obvious physical damage, and then reinsert the drive into the drive bay.

9. Remove any installed PC Cards from the PC Card slot, verify that they are free of obvious physical damage, and then reinsert the card(s) into the PC Card slot.

10. Remove the memory module cover, and verify that at least one SODIMM is installed (the computer will not boot unless memory is installed). Remove any installed memory modules, verify that they are free of obvious physical damage, and then reinstall them.

11. Open the display assembly, and verify that it is free of obvious physical damage.

12. Verify that the internal keyboard is free of obvious physical damage and that its keys operate freely.

13. Verify that the touch-pad switches operate freely.

14.If an external monitor is connected, verify the following:

- The monitor's interface cable is properly attached to the video connector on the I/O panel.
- The captive screws that secure the connectors at each end of the interface cable are secure enough to ensure a firm connection.
- The monitor's power cable is attached to a power source and free of obvious physical damage.
- The monitor's controls are set according to the instructions in the documentation for the monitor.
- The monitor and its interface cable are free of obvious physical damage.

15.If an external mouse is connected, verify the following:

- The mouse is properly connected to the PS/2 connector on the computer's I/O panel.
- The mouse and its cable are free of obvious physical damage.
- The mouse's ball and push buttons operate freely.

16.For any attached serial or parallel devices, verify the following:

- The device's interface cable connector is correctly attached to the appropriate port connector on the computer's I/O panel.
- The captive screws that secure the connectors at each end of the interface cable are secure enough to ensure a firm connection.
- The attached device and its interface cable are free of obvious physical damage.

17.Turn on any attached peripherals and then the computer.

Does the problem reoccur?

Yes. Proceed to the next procedure, "Observing the Boot Routine."

No. No further steps are necessary.

Observing the Boot Routine

After you perform a visual inspection as described in the previous section, boot the computer from a copy of the diagnostics diskette and, while the boot routine is running, observe the computer for any indications of problems.



NOTE: To prevent possible damage to the original Dell Diagnostics Diskette, Dell recommends that users make copies of the diskette and always use a backup copy when servicing a user's computer. For instructions, see "Before You Start Testing" in Chapter 4 of the Dell Latitude CP Reference and Troubleshooting Guide.

To observe the boot routine, follow these steps:

- 1. Turn off the computer and any attached peripherals.**
- 2. If necessary, install a diskette drive in the media bay. Insert a diagnostics diskette into the diskette drive. Turn on all peripherals and then the computer.**
- 3. Watch the indicators on the top of the keyboard. After all three indicators flash momentarily, the Num Lock indicator should light up and remain on.**

Do these indicators light up within approximately 10 seconds after the boot routine starts?

Yes. Proceed to step 4.

No. Troubleshoot the power subsystem.

- 4. While the boot routine is running, observe the computer for any of the following:**
 - Drive access indicator — This indicator lights up in response to data being transferred to or from the drives. If the indicator fails to light during the boot routine, troubleshoot the diskette-drive or hard-disk drive subsystem, as appropriate.
 - Error codes — If the numbers lock (Num Lock), the capitals lock (Caps Lock), and the Scroll Lock indicators flash simultaneously during the boot routine, refer to Table 3-1.
 - Battery failure codes — If the battery indicator flashes alternately green and amber, or flashes amber four times per second, refer to Table 3-2.
 - System error messages — These messages can indicate problems or provide status information. If a system error message displays, refer to Table 3-3.

- 5. Observe the display for the Diagnostics Menu.**

Does the Diagnostics Menu display?

Yes. See "Running the Dell Diagnostics" in Chapter 3.

No. Proceed to step 6.

- 6. Insert a copy of the diagnostics diskette into the diskette drive, and reboot the computer.**

Does the Diagnostics Menu display?

Yes. See "Running the Dell Diagnostics" in Chapter 3.

No. Proceed to the next section, "Eliminating Resource Conflicts."

Eliminating Resource Conflicts

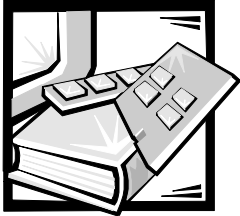
Devices within the computer may require dedicated memory spaces, interrupt levels, or DMA channels, all of which must be allocated during installation of the devices. Because devices may be installed at different times, it is possible that the same resource is assigned to two or more devices.

Resource conflicts can result in disorderly or erratic computer operation or failure of the computer to operate at all. If you suspect that resource conflicts might exist, check the computer and reassign the resources as necessary.

For more information about resolving conflicts, see Chapter 3, "Troubleshooting Your Computer," in the *Reference and Troubleshooting Guide*.

Getting Help

If none of the procedures in this chapter reveals the source of the problem or leads to the proper troubleshooting steps for determining the source of the problem, call Dell for technical assistance. For instructions, see Chapter 5, "Getting Help," in the *Reference and Troubleshooting Guide*.



CHAPTER 3

System Error Messages

This chapter describes system error messages that can occur during computer startup or, in the case of some failures, during normal computer operation. The tables in this chapter list POST error codes, battery failure codes, and system error messages, as well as their probable causes.

If a faulty computer does not display a POST error code or system error message to indicate a failure, use the Dell Diagnostics to help isolate the source of the problem. See “Running the Dell Diagnostics” found later in this chapter.

POST Error Codes

If the computer's display cannot display error messages during the POST, the numbers lock (Num Lock), the capitals lock (Caps Lock), and the Scroll Lock indicators display codes that identify the problem or help you identify a faulty component or assembly. The following table lists the error codes that may be generated during POST. Most error codes indicate a fatal error that requires replacement of the system board or other corrective actions before the computer can operate.

NOTE: To display an error code, all three system indicators flash simultaneously (not sequentially). These “flash” codes are the same as the audible “beep” codes used by the Dell Latitude XPi portable computer, for instance.

Table 3-1. POST Error Codes

Indicator Code	Error	Probable Causes
1-1-3	NVRAM write/read failure	BIOS corrupted; system board faulty
1-1-4	ROM BIOS checksum failure	BIOS corrupted; system board faulty
1-2-1	Programmable interval timer failure	System board faulty
1-2-2	DMA initialization failure	System board faulty
1-2-3	DMA page register write/read failure	System board faulty
1-3-1 through 1-1-1	Installed memory module(s) not being properly identified or used	Memory module improperly seated or system memory controller faulty (system board faulty)
3-1-1	Slave DMA register failure	System board faulty
3-1-2	Master DMA register failure	
3-1-3	Master interrupt mask register failure	System board faulty
3-1-4	Slave interrupt mask register failure	
3-2-4	Keyboard controller test failure	Keyboard assembly faulty or system board faulty
3-3-4	Display memory test failure	System board faulty
3-4-1	Display initialization failure	
3-4-2	Display retrace test failure	
4-2-1	No timer tick	System board faulty
4-2-2	Shutdown failure	
4-2-3	Gate A20 failure	
4-2-4	Unexpected interrupt in protected mode	

Table 3-1. POST Error Codes (continued)

Indicator Code	Error	Probable Causes
4-3-1	Memory failure above address 0FFFFh	Memory module improperly seated or system memory controller faulty (system board faulty)
4-3-3	Timer chip counter 2 failure	System board faulty
4-3-4	Time-of-day clock stopped	Reserve battery faulty or system board faulty
4-4-1	Serial port failure	System board faulty
5-1-2	No usable memory	Memory module improperly seated or system memory controller faulty (system board faulty)

Battery Failure Codes

In the event of a battery failure, the battery indicator displays indicator codes that identify the severity of the problem. The following table lists these failure codes.

Table 3-2. Battery Failure Codes

Battery Indicator Code	Severity of Failure	Probable Causes	Action
Indicator flashes alternately green and amber.	Temporary	Over temperature; abnormal discharge; abnormal charge; abnormal charge current	Turn off the computer and let the battery and computer cool to room temperature.
Indicator flashes amber four times per second.	Fatal	Cell imbalance; critical discharge	Replace the battery.

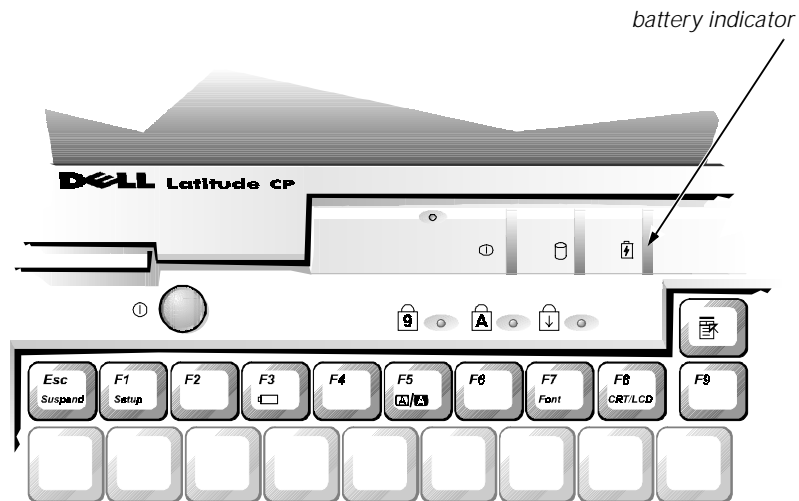


Figure 3-1. Battery Indicator

System Error Messages

The following table lists (in alphabetical order) system error messages that may appear on the display during the boot routine or during normal computer operation.

Table 3-3. System Error Messages

Message	Definition	Probable Causes
Auxiliary device failure	Integrated touch pad or external PS/2 mouse failed.	Integrated touch pad or external PS/2 mouse faulty.
Bad command or File Name	Command entered does not exist or is not in path-name specified.	Bad command or filename entered.
Cache disabled due to failure	Microprocessor's internal cache memory failed.	System board faulty.
Data error	Diskette or hard-disk drive cannot read the data.	Faulty diskette/tape drive subsystem or hard-disk drive subsystem.
Decreasing available memory	Informational message indicating memory is failing (usually preceded by memory error message).	One or more DIMMs faulty or improperly seated.
Disk C: failed initialization	Hard-disk drive failed to initialize.	Hard-disk drive improperly seated in modular bay. Hard-disk drive damaged. System files missing or corrupted.
Diskette drive 0 seek failure	System cannot read diskette in diskette drive.	Diskette faulty or incorrectly inserted in drive.
Diskette read failure	System cannot read diskette in diskette drive.	System Setup contains incorrect settings. Diskette drive interface loose or faulty. Diskette drive faulty.
Diskette subsystem reset failed	Diskette subsystem failed to respond to reset command from computer.	System board faulty.

Table 3-3. System Error Messages (continued)

Message	Definition	Probable Causes
Diskette write-protected	Diskette is write-protected; operation cannot be completed.	Diskette write-protected.
Drive not ready	The diskette may be missing from or improperly installed in the diskette drive.	Defective or unformatted diskette.
Error reading PCMCIA card	Computer cannot identify PC Card.	PC Card faulty, improperly seated, or improperly configured. System board faulty. PC Card software faulty or incorrectly installed.
Extended memory size has changed	Amount of memory recorded in NVRAM does not match memory installed in computer.	One or more memory modules faulty or improperly seated.
Gate A20 failure	Computer cannot enable protective mode.	One or more memory modules faulty or improperly seated. System board faulty.
General failure	Message indicates system failure.	Operating system unable to carry out the command.
Hard-disk drive configuration error	Computer cannot identify hard-disk drive type.	Installed hard-disk drive not compatible with computer.
Hard-disk drive controller failure 0	Hard-disk drive or controller not responding to commands from computer.	System board faulty.
Hard-disk drive controller failure 1	The CD-ROM drive does not respond to commands from the computer.	System board faulty.
Hard-disk drive failure	Hard-disk drive not responding to commands from computer.	Computer needs rebooting.
Hard-disk drive read failure		Hard-disk drive faulty.

Table 3-3. System Error Messages (continued)

Message	Definition	Probable Causes
Invalid configuration information – please run System Setup program	System Setup contains invalid settings.	System Setup program contains incorrect settings. NVRAM reserve battery weak or depleted.
Keyboard controller failure	Keyboard controller not responding.	Cable or connector loose, or keyboard faulty.
Keyboard clock line failure	Keyboard not responding.	Cable or connector loose, or keyboard faulty.
Keyboard data line failure		
Keyboard stuck key failure	Keyboard key(s) jammed.	For external keyboard or keypad, cable or connector loose or keyboard faulty. For built-in keyboard, keyboard faulty. For either keyboard, key may have been pressed while computer was booting.
Memory address line failure at <i>address</i> , read <i>value</i> expecting <i>value</i>	Memory control logic not operating properly.	Installed memory module faulty or improperly seated.
Memory allocation error	The software in use conflicts with the operating system, an application program, or a utility.	Faulty application program.

Table 3-3. System Error Messages (continued)

Message	Definition	Probable Causes
Memory data line failure at address, read value expecting value	Memory not operating properly.	Installed memory module faulty or improperly seated.
Memory double word logic failure at address, read value expecting value		
Memory odd/even logic failure at address, read value expecting value		
Memory write/read failure at address, read value expecting value		
No boot device available	Computer not recognizing diskette drive or hard-disk drive from which it is trying to boot.	No boot device available.
No boot sector on hard-disk drive	No boot sector on hard-disk drive.	Operating system boot files missing or corrupted.
No timer tick interrupt	Timer on system board malfunctioning.	System board faulty.
Non-system disk or disk error	Unable to boot from hard-disk drive or diskette drive.	No operating system files on hard-disk drive or diskette.
Not a boot diskette		
Optional ROM bad checksum	ROM in external device failed.	Optional ROM in external device faulty.
Sector not found	MS-DOS [®] unable to locate a sector on diskette or hard-disk drive.	Bad sector or corrupted FAT on diskette or hard-disk drive.

Table 3-3. System Error Messages (continued)

Message	Definition	Probable Causes
Seek error	MS-DOS unable to find specific track on diskette or hard-disk drive.	Defective diskette or hard-disk drive.
Shutdown failure	Microprocessor unable to reset.	System board faulty.
Time-of-day clock lost power	System clock stopped.	Reserve battery lost its charge.
Time-of-day clock stopped		
Time-of-day not set—please run the System Setup program.	Time or date stored in RTC does not match system clock.	Reserve battery lost its charge. System board faulty.
Timer chip counter 2 failed	Timer circuit on system board malfunctioning.	System board faulty.
Unexpected interrupt in protected mode	Keyboard/mouse controller malfunctioning, or memory module(s) not responding.	One or more memory module(s) faulty or improperly seated.
Warning! Battery is critically low.	Battery is running out of power.	Battery needs recharging.

Running the Dell Diagnostics

The diagnostics contains tests that aid in troubleshooting the computer. If needed, see Chapter 4, "Running the Dell Diagnostics," in the *Reference and Troubleshooting Guide*. The diagnostics diskette contains the following test groups:

- RAM — Tests the main memory
- System Set — Tests the system board's primary functions
- Video — Tests the video subsystem
- Keyboard — Tests the keyboard subsystem
- Mouse — Tests the mouse/touch-pad subsystem
- Diskette Drives — Tests the diskette drive subsystem
- Hard-Disk Drives (Non-SCSI) — Tests the IDE hard-disk drive subsystem
- IDE CD ROM Drives — Tests the CD-ROM drive subsystem
- Serial/Infrared Ports — Tests the serial communication port
- Parallel Ports — Tests the parallel communication port

- SCSI Devices — Tests the SCSI controller in the C/Port APR or the C/Dock Expansion Station
- Network Interface — Tests the network controller in the C/Port APR or the C/Dock Expansion Station
- Audio — Tests the built-in sound subsystem
- Other — Tests the cooling fan, which works with the air intake on the computer as part of the automatic thermal management system.



CAUTION: To prevent possible damage to the original diagnostics diskette, always use a backup copy when servicing a user's system. If a backup copy has not already been made, do so before running the diagnostics.

Follow these steps to start the diagnostics.



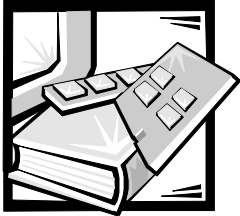
NOTE: You must have a diskette-drive cable to perform the following procedure. If you do not have a diskette-drive cable, you can get one from Dell. See Chapter 5, "Getting Help," in the Reference and Troubleshooting Guide for information on contacting Dell.

- 1. Install a CD-ROM drive in the modular bay.**
- 2. Turn off the computer.**
- 3. Attach the diskette drive to the parallel port connector on the back of the computer.**
- 4. Place the backup copy of the *Dell Diagnostics Diskette* in the diskette drive, and boot the computer.**

Starting the diagnostics causes the Dell logo screen to appear, followed by a message indicating that the diagnostics is loading. Before the diagnostics loads, a program tests the portion of main memory (RAM) required for loading the diagnostics. If a main memory error is detected, a message appears on the screen telling you which memory address failed.

If no errors are found in main memory, the diagnostics loads and the Diagnostics Menu appears. This menu lets you choose the following options or exit to the MS-DOS prompt:

- Run Quick Tests — Runs selected tests from all test groups to quickly locate the failure or to indicate where further testing may be needed to isolate a failure
- Run All Tests — Runs all tests for a thorough test of the computer
- Run Specific Tests — Tests a particular area or subsystem



CHAPTER 4

Removing and Replacing Parts

This chapter provides instructions for removing and replacing field-replaceable components, assemblies, and subassemblies. Unless otherwise noted, each procedure in this chapter assumes the following:

- The computer and any attached peripherals are turned off, and the peripherals are disconnected from the I/O panel on the back of the computer.
- A part can be replaced by performing the removal procedure in reverse order.

When the display assembly is open nearly 180 degrees, use a book or something similar to support it. The angle of the display assembly with respect to the bottom case should never be allowed to exceed 180 degrees. Also, when performing the procedures in this chapter, the locations or directions relative to the computer are as shown in Figure 4-1 unless otherwise specified.

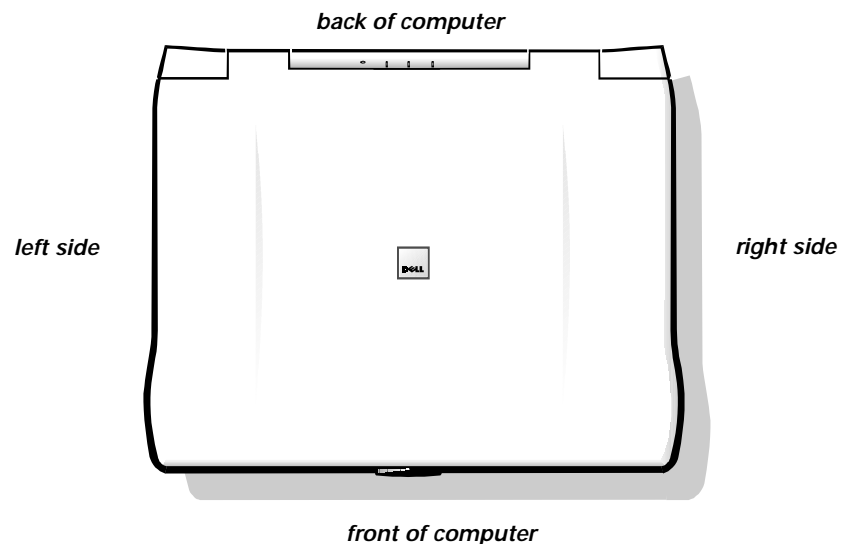


Figure 4-1. Computer Orientation

Recommended Tools

Most of the procedures in this guide require the use of one or more of the following tools:

- Number 1 magnetized Phillips-head screwdriver
- Small flat-blade screwdriver
- Small plastic scribe

Precautionary Measures



WARNING: For your personal safety and protection of the equipment, perform the following steps in the sequence listed.

Before you start to work on the computer, perform the following steps:

- 1. To avoid possible damage to the computer from ESD, periodically ground yourself by touching the metal surface of an I/O connector on the computer's back panel.**
- 2. Save any work in progress and close all open applications.**
- 3. Turn off the computer and any attached peripherals.**



NOTE: Make sure the computer is turned off and not in suspend-to-disk mode. If you cannot shut down the computer using the computer's operating system, press the power button for 4 seconds.

- 4. If the computer is docked in a C/Port Advanced Port Replicator (APR) or C/Dock Expansion Station, undock the computer.**
- 5. Disconnect the computer and any attached peripherals from AC power sources to reduce the potential for personal injury or shock. Also disconnect any telephone or telecommunications lines from the computer.**
- 6. Disconnect all other external cables from the computer.**
- 7. Remove any installed PC Cards.**



CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

- 8. Remove any diskette drive, CD-ROM drive, travel module, or battery installed in the modular bay. Close the display and turn the computer over. Push the modular bay latch away from the center of the computer. While holding the latch with one hand, pull the device out of the modular bay with the other hand.**

9. Remove the main battery assembly from the battery bay.

Slide the battery bay latch away from the center of the computer. Then slide the battery out of the battery bay (see Figure 4-2).

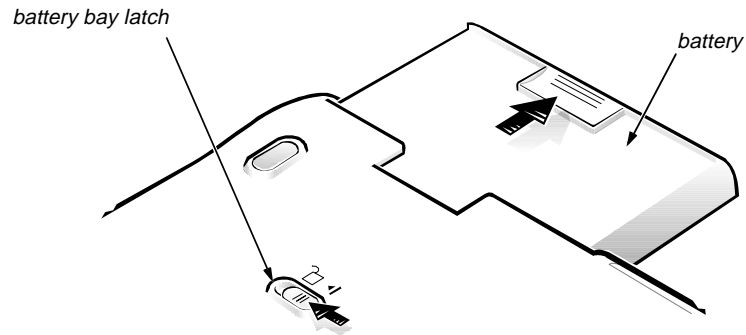


Figure 4-2. Main Battery Assembly Removal

10. Remove the hard-disk drive assembly (see “Hard-Disk Drive Assembly” found later in this chapter).

Screw Identification and Tightening

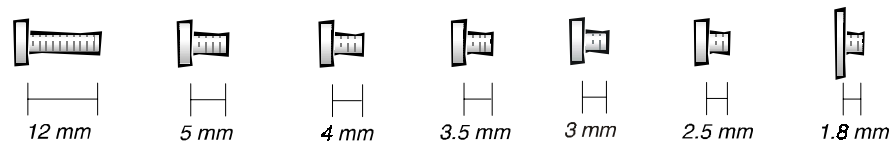


Figure 4-3. Screw Identification



CAUTION: When reinstalling a screw, it is essential that a screw of the correct length be used. Otherwise, hardware damage could result. Make sure that the screw is properly aligned with its corresponding hole, and avoid overtightening.

The illustrations in the following removal procedures provide the correct screw length as part of the screw's label. A graphic for that length screw is also included in the illustration. Match the actual screw to the graphic in the illustration to check for correct length.

ZIF Connectors

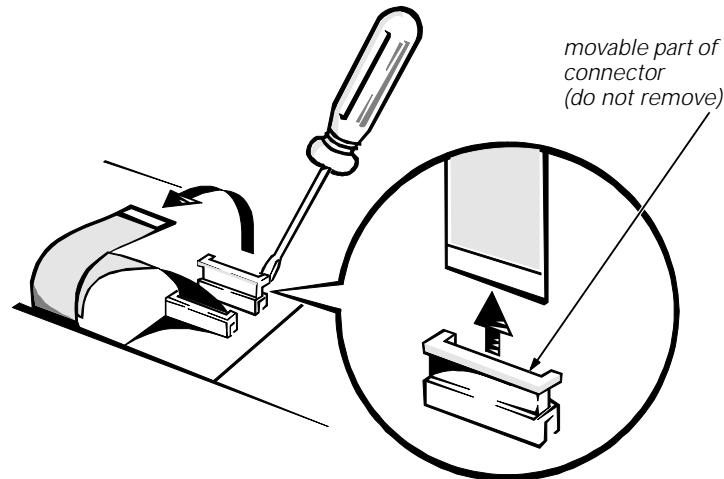


Figure 4-4. Disconnecting an Interface Cable

Some of the computer's interface connectors are zero insertion force (ZIF) connectors. These connectors are not removable, but they must be released to disconnect a cable from them



CAUTION: The ZIF connectors are fragile. To avoid damage, do not apply too much pressure to the movable part of the connector.

To disconnect an interface cable from a ZIF connector, follow these steps:

- 1. Insert a small flat-blade screwdriver under the movable part of the connector.**
- 2. Pull gently upward on the movable part of the connector until it releases the interface cable.**
- 3. Grasp the interface cable and pull it out of the connector.**

To reconnect an interface cable to a ZIF connector, follow these steps:

- 1. Use a small flat-blade screwdriver to open the movable part of the ZIF connector.**
- 2. Orient the end of the interface cable with the ZIF connector, and insert the end of the cable into the connector.**
- 3. While holding the cable in place, close the ZIF connector.**

To ensure a firm connection, make sure the ZIF connector is completely closed.

Field-Replaceable Parts and Assemblies

Table 4-1 lists the parts and assemblies available for the computer. Some parts may only be available as part of a service kit or assembly, and are provided for reference only. The subsections that follow Table 4-1 provide instructions for removing and replacing these parts and assemblies.

Table 4-1. Parts and Assemblies

Part or Assembly Name	Order Name	Figure
AC Adapter and Power Cords		
Customer kit, AC adapter	CUS,ADPT,AC,EXT,20V,70W, NBK,CP	
AC adapter	ADPT,AC,EXT,20V,70W, NBK,CP	
Power cable, Australia	CORD,PWR,110V,6F, AC ADPT,AUS	
Power cable, U.S.	CORD,PWR,110V,6F, AC ADPT,US	
Audio Board		
Service kit, audio board	SVC,PWA,AUDIO,CP	4-25
Audio Shield		
Audio shield	SHLD,W/SPR,AUDIO CRD	4-25
Back Cover Assembly		
Service kit, back cover assembly	SVC,SUBASSY, BK CVR/DOOR,I/O,CP	4-5, 4-11
Back cover assembly	ASSY,BK PLT/DOOR,I/O,CP	
Docking bar	BAR,DOOR,DCKG,MET	
Docking door	DOOR,DCKG,PLSTC,I/O	
Battery (Main)		
Customer kit, main battery	CUS,BTRY,MN,14.4V,8CELL, LITH	4-2
Main battery	BTRY,MN,14.4V,8CELL,LITH	
Battery (Reserve)		
Service kit, reserve battery	SVC,BTRY,RSRV,7.2V,30MAH,6, NIHD	4-32
Reserve battery	BTRY,RSRV,7.2V,30MAH,6, NIHD	
Reserve battery sponge pad	PAD,FOAM,BRTY,RSRV,CP	

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
Bottom Case Assembly		
Bottom case assembly	ASSY,CVR,BTM,PLSTC, BASE,CP	4-5, 4-24
Bottom Case Bracket		
Bottom case bracket assembly	ASSY,BRKT,CASE,BTM	4-27
CD-ROM Drive Subassembly		
Service kit, CD-ROM drive	SVC,SUBASSY,CD,20X, NBK,SANYO	4-25
CD-ROM drive bezel	BZL,CD	
20X CD-ROM drive	CD,680M,10X,INT,NBK	
CD-ROM drive interface board	PWA,CD/FDD INTERCONN,SE	
Bottom CD-ROM drive cover	CVR,BTM,PLSTC,CD,CP	
Top CD-ROM drive cover	CVR,TOP,PLSTC,CD,CP	
CD-ROM drive shield	SHLD,CD,CP	
CD-ROM drive label	LBL,REG,CD,20X	
Diskette Drive Subassembly		
Diskette drive service kit	SVC,SUBASSY,FD,F3, INT/EXT,CP	4-25
Diskette drive subassembly	SUBASSY,FD,F3,INT/EXT,CP	
Diskette drive	FD,F3,CP	
Diskette drive assembly bottom cover	CVR,BTM,PLSTC,FD,F3,CP	
Diskette drive assembly top cover	CVR,TOP,PLSTC,FD,F3,CP	
Diskette drive assembly interface board	PWA,INTFC,FD,F3,CP	
Diskette drive assembly interface cable	CBL,FPC,FD,F3,CP	
Diskette drive assembly shield	SHLD,FD,F3,CP	
Exhaust Fan		
Service kit, exhaust fan	SVC,FAN,25X25X10,CP	4-31

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
Hard-Disk Drive Assemblies		
Hard-disk drive, subassembly	SUBASSY,HD,xxxxx,l,yyyMM,CP*	4-6
Hard-disk drive	HD,xxxxx,l,yyMM,NBK,zzz*	
Hard-disk drive interface board	PWA,INTERCONN,HD,CP	
Hard-disk drive bracket	BRKT,HD,CP	
Hard-Disk Drive Bracket/Door Assembly		
Hard-disk drive carrier bracket/door assembly service kit	SVC,ASSY,BRKT/DOOR,HD,CP	4-6
Hard-disk drive carrier door	DOOR,HD,12.5MM,CP	
Hard-disk drive carrier bracket	BRKT,HD,12.5MM,CP	
Hard-disk drive carrier insulator	INSUL,HD,CP	
Hard-disk drive carrier screws	SCR,M3X3,PHH,LP,ZPS	
I/R Board		
Service kit, I/R board	SVC,PWA,FAST IR,CP	4-32
Keyboards		
Keyboard, Belgian	KYBD,88,BEL,CP	4-10
Keyboard, Chinese	KYBD,87,CHI,CP	
Keyboard, Danish	KYBD,88,DEN,CP	
Keyboard, French	KYBD,88,FR,CP	
Keyboard, French/Canadian	KYBD,87,FR CAN,CP	
Keyboard, German	KYBD,88,GER,CP	
Keyboard, Italian	KYBD,88,ITALIAN,CP	
Keyboard, Japanese	KYBD,90,JPN,CP	
Keyboard, Korean	KYBD,87,KOR,CP	
Keyboard, Latin American	KYBD,88,LAC,CP	
Keyboard, Norwegian	KYBD,88,NOR,CP	
Keyboard, Portuguese	KYBD,88,PORTUGEUSE,CP	

* Substitute the drive capacity for xxxxx, the drive height for yy, and the manufacturer for zzz.

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
Keyboards (continued)		
Keyboard, Russian	KYBD,87,RUS,CP	
Keyboard, Spanish	KYBD,88,SPN,CP	
Keyboard, Swedish/Finnish	KYBD,88,SWE,CP	
Keyboard, Swiss	KYBD,88,SWI,CP	
Keyboard, Thailand	KYBD,87,THAI,CP	
Keyboard, U.K.	KYBD,88,UK,CP	
Keyboard, U.S.	KYBD,87,DOM,CP	
LCD Assemblies, 12.1-Inch Display		
Bezel service kit, 12.1-inch display	SVC,BZL,LCD,12.1";CP	4-14, 4-17
Display assembly bezel	BZL,LCD,TFT,12.1";CP	
Bezel retaining screw covers, upper corners, 12.1-inch display	CVR,SCR,TOP,RND,ADH	
bezel retaining screw covers, lower	CVR,SCR,BTM,OVAL,ADH	
Display-assembly-bezel retaining screw covers, latch, 12.1-inch display	CVR,SCR,TOPOVAL,SM,ADH,12.1	
Display top-cover service kit, 12.1-inch display	SVC,ASSY,CVR,TOP,LCD,12.1";CP	
Display top cover	CVR,TOP,LCD,TFT,12.1";CP	
Display top-cover EMI shield	SHLD,EMI,DIS,TFT/STN,12.1";CP	

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
LCD Assemblies, 12.1-Inch Display (continued)		
LCD/Cable service kit, Samsung	SVC,LCD/CBL/INV, TFT,SMSNG,CP	4-18
LCD inverter board subassembly	SUBASSY,PWA,INVRTR W/INSUL,LCD,CP	
LCD cable subassembly, Samsung	SUBASSY,CBL/HLDR,TFT, SMSNG,CP	
LCD panel, Samsung	LCD,TFT,SVGA,12.1"; SMSNG	
LCD/Cable service kit, Sharp	SVC,LCD/CBL/INV, TFT,SHARP,CP	
LCD inverter board assembly	ASSY,PWA,INVRTR,LCD,CP	
LCD cable subassembly, Sharp (TFT)	SUBASSY,CBL/HLDR,TFT, SHARP,CP	
LCD cable subassembly, Sharp (STN)	SUBASSY,CBL/HLDR,STN, SHARP,CP	
LCD panel, Sharp (TFT)	LCD,TFT,SVGA,12.1"; SHARP	
LCD panel, Sharp (STN)	LCD,STN,SVGA,12.1"; SHARP	
LCD Assemblies, 13.3-Inch XGA Display		
Bezel service kit, 13.3-inch TFT display	SVC,BZL,LCD,13.3";CPX	4-15, 4-17
Display assembly bezel	BZL,LCD,TFT,13.3";CPX	
Bezel retaining screw covers, upper corners, 13.3-inch display	CVR,SCR,LCD,13.3";TOP, OVAL,CPX	
Bezel retaining screw covers, lower	CVR,SCR,BTM,RND,ADH	
Display-assembly-bezel retaining screw covers, latch, 13.3-inch display	BMPR,RBR,UPR,LCD,13.3"; NBK,CPX	

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
LCD Assemblies, 13.3-Inch XGA Display (continued)		
Display top cover service kit, 13.3-inch display	SVC,CVR,TOPLCD,13.3"	4-19
Display top cover	CVR,LCD,TOPTFT,13.3"	
Display top-cover shield	SHLD,EMI,DIS,TFT,13.3"	
LCD/Cable service kit, Samsung	SVC,LCD/CBL/INV,SMSNG, CPX	
LCD inverter board	PWA,INVRTR,LCD,13.3";CPX	
LCD inverter board shield	SHLD,INVRTR,LCD,MYLAR, 13.3";CPX	
LCD cable subassembly, Samsung	SUBASSY,CBL/HLDR,SMSNG, CPX	
LCD panel, Samsung	LCD,TFT,XGA,13.3";CP, SMSNG	
LCD/Cable service kit, Sharp	SVC,LCD/CBL/INV,SHARP, CPX	
LCD inverter board	PWA,INVRTR,LCD,13.3";CPX	
LCD inverter board shield	SHLD,INVRTR,LCD,MYLAR, 13.3";CPX	
LCD cable subassembly, Sharp	SUBASSY,CBL/HLDR,TFT, SHARP,CP	
LCD panel, Sharp	LCD,TFT,XGA,13.3";CP,SHARP	
LCD Latch Assembly, 12.1-Inch Display		
Latch service kit, 12.1-inch LCD display	SVC,LATCH,DIS,BZL,CP	4-14
LCD Latch Assembly, 13.3-Inch Display		
Latch service kit, 13.3-inch LCD display	SVC,LATCH,DIS,BZL,CPX	4-15

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
LCD Parts, Miscellaneous		
Left hinge, 12.1-inch display	HNG,LF,LCD,TFT/STN,12.1"	4-14
Right hinge, 12.1-inch display	HNG,RT,LCD,TFT/STN,12.1"	
Left hinge, 13.3-inch display	HNG,LF,LCD,TFT,13.3"	4-15
Right hinge, 13.3-inch display	HNG,RT,LCD,TFT,13.3"	
Right bracket, 12.1-inch display	BRKT,RT,LCD,TFT/STN	4-14
Reed switch magnet, 12.1-inch display	SWT,SUS,MGNT,DSPL,TFT/STN	
Plastic inverter-board screw caps, 12.1-inch display	SPCR,SCR,INVRTR,TFT	
Memory		
Customer kit, memory module, 16-MB	CUS,DIMM,16,60N,2X64,2K,144,EDO,NBK	4-8
Customer kit, memory module, 32-MB	CUS,DIMM,32,60N,4X64,4K,144,EDO,NBK	
Customer kit, memory module, 64-MB	CUS,DIMM,64,60N,8X64,4K,144,EDO,NBK	
Memory Door		
Service kit, memory door assembly	SVC,SUBASSY,DOOR, MEM/BIOS,CP	4-7
Memory/BIOS door subassembly	SUBASSY,DOOR, MEM/BIOS,NB,CP	
Miscellaneous Parts		
Touch-pad bracket	BRCKT,TPAD,CP	4-13
Air flow duct	GDE,INTK,AIR,FAN,PLSTC,CP	4-30
Palmrest Assembly		
Service kit, palmrest assembly	SVC,SUBASSY,PLMRST,CP	4-12
Palmrest assembly	ASSY,PLMRST,GRY,CP	
Power button	SWT,PWR SW, CP	
Power button spring	SPR,PWR SW,CP	

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
Screws		
LCD panel	SCR,M3X5,PHH,LP,ZPS	4-18, 4-19
LCD hinge	SCR,M3X5,PHH,LP,ZPS	4-16
LCD inverter board	SCR,M3X5,PHH,LP,ZPS	4-21
LCD bezel and latch, 12.1-inch display	SCR,M3X5,PHH,LP,ZPS	4-17
Keyboard	SCR,M2.6X12,PHH,LP,ZPS	4-9
Thermal cooling assembly	SCR,M2X2.5,PHH,LP,ZPS	4-30
Touch-pad	SCR,M2.6X1.8,PHH,XLP,ZPS	4-13
Palmrest, front edge	SCR,M2.6X12,PHH,LP,ZPS	4-12
Palmrest, hard-disk drive area	SCR,M2.6X5,PHH,LP,ZPS	4-12
I/R board	SCR,M2.6X5,PHH,LP,ZPS	4-32
Upper EMI shield, 1st	SCR,M2.6X5,PHH,LP,ZPS	-
PC/Video board	SCR,M2.6X5,PHH,LP,ZPS	-
Back cover	SCR,M2.6X5,PHH,LP,ZPS	4-11
Audio board	SCR,M2.6X5,PHH,LP,ZPS	4-26
Upper EMI shield, 2nd	SCR,M2.6X5,PHH,LP,ZPS	
Bottom-case bracket	SCR,M2.6X5,PHH,LP,ZPS	4-27
Exhaust fan	SCR,M2.6X12,PHH,LP,ZPS	4-31
Speakers		
Left speaker assembly	SUBASSY,SPKR,LF,W/WIRES	
Right speaker assembly	SUBASSY,SPKR,RT,W/WIRES	
System Board Assembly		
System board assembly, CPxxx,service kit *	SVC,ASSY,PRM/ PWA,ENGINE,CPxxx*	4-30
System board assembly, CPIxxx,service kit *	SVC,ASSY,PRM/ PWA,ENGINE,CPIxxx*	
Service tag install disk	DISK,FLD SERV,F3,US,LXP	
System board assembly with system board and processor module	ASSY,PRM/PWA,ENGINE, CPxxx*	

* Substitute the drive capacity for xxxxx, the drive height for yy, and the manufacturer for zzz.

Table 4-1. Parts and Assemblies (continued)

Part or Assembly Name	Order Name	Figure
System Board Assembly (continued)		
System board assembly with system board and processor module	ASSY,PRM/PWA,ENGINE,CPIxxx*	
System-board engine subassembly	SUBASSY,PWA/ENGINE,CP	
I/R board	PWA,FAST IR,CP	
Microphone boot	GRMT,RBR,BOOT,MCPHN	
Main system board	PWA,PLN,0M,NB,CP	
Video/PC Card board	PWA,DTRBD,VID/PCMCIA,CP	
LED board	PWA,LED,CP	
Lower EMI shield	SHLD,BTM,PLN ASSY,CP	
Upper EMI shield, 1st	SHLD,TOP,1ST,PLN ASSY,CP	
Upper EMI shield, 2nd	SHLD,TOP,2ND,PLN ASSY,CP	
Exhaust fan and cable	FAN,25X25X10,CP	
Microphone	MCPHN,CP	
Reserve battery	BTRY,RSRV,7.2,30MAH,6,NIHD	
Foam pad	PAD,FOAM,BTRY,RSRV,CP	
Thermal Cooling Assembly		
Service kit, thermal cooling subassembly	SVC,SUBASSY,HTSNK,CPU,HYB,CP	4-30
Touch Pad		
Touch-pad service kit	SVC,TPAD,SQ,INTFC,CP	4-13
Touch-pad subassembly	TPA,INTFC,CP	

* Substitute the drive capacity for xxxxx, the drive height for yy, and the manufacturer for zzz.

Removing Field-Replaceable Parts and Assemblies

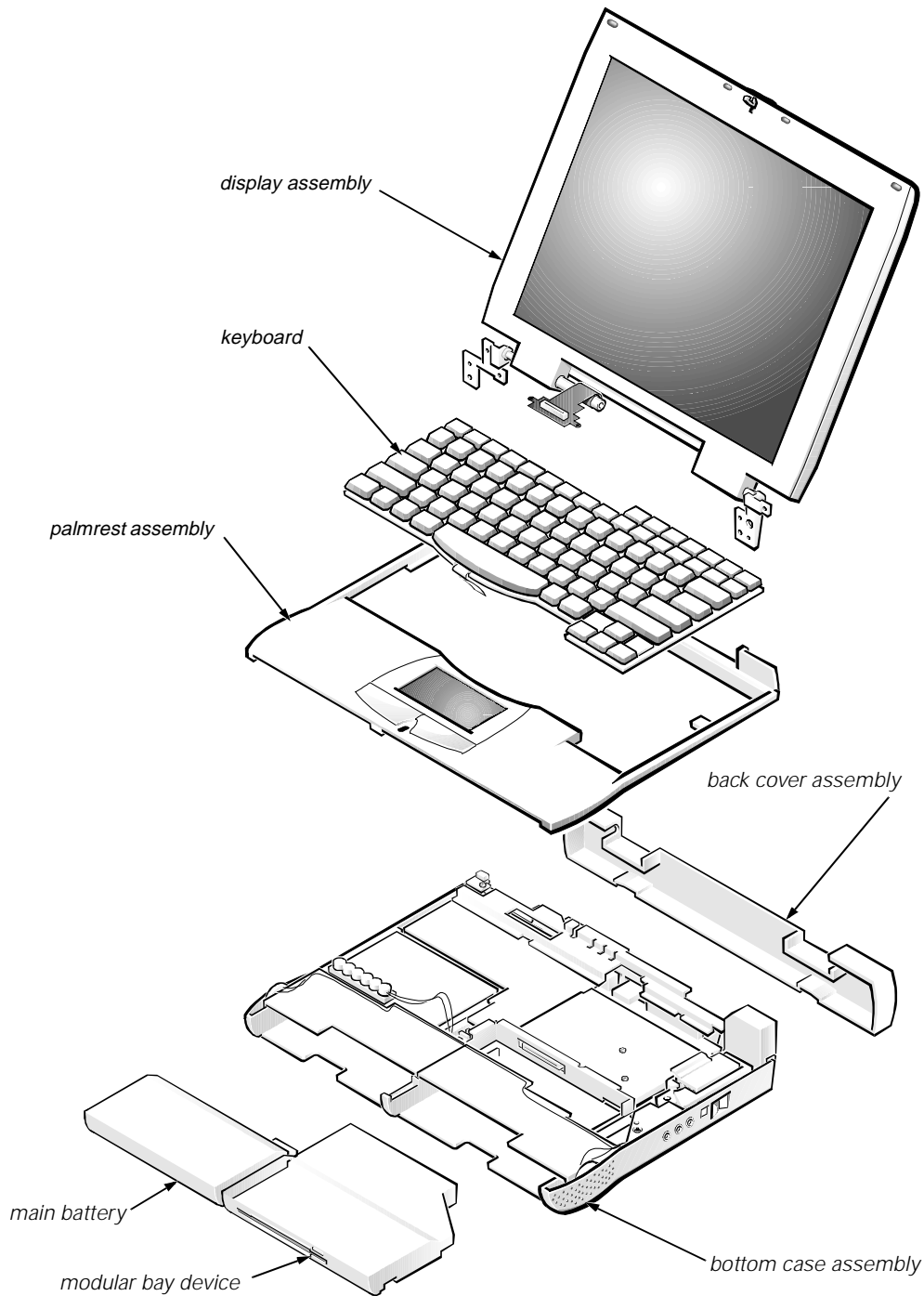


Figure 4-5. Exploded View—Computer

The following subsections provide instructions for removing and replacing field-replaceable parts and assemblies.

Hard-Disk Drive Assembly

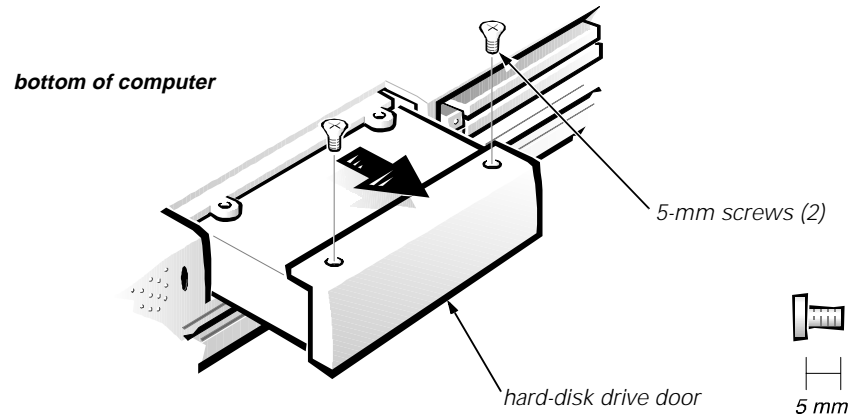


Figure 4-6. Hard-Disk Drive Assembly Removal

- 1. Turn the computer over, and remove the two 5-mm screws from the hard-disk drive door.**

The drive is on the left side of the computer.



CAUTION: The hard-disk drive is very sensitive to shock. Handle the assembly by its edges (do not squeeze the top of the hard-disk drive case), and avoid dropping it.

- 2. Grasp the drive door and pull the drive out of the computer.**

Memory Module Cover

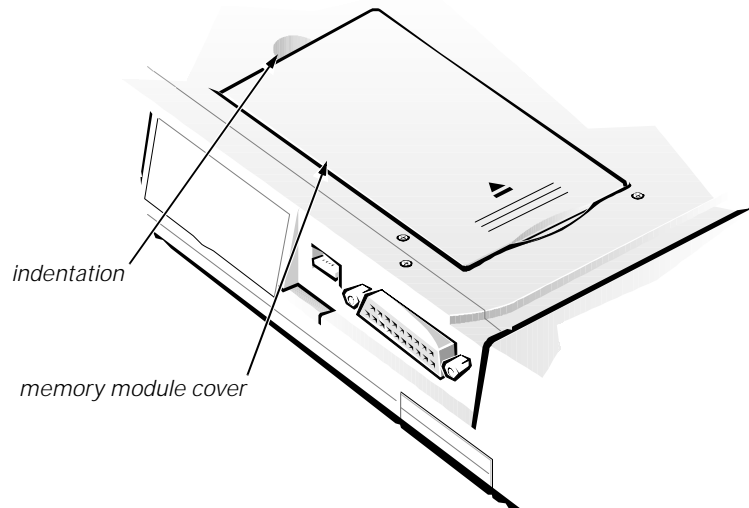


Figure 4-7. Memory Module Cover Removal



CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

- 1. Close the display, and turn the computer upside down on a flat work surface.**
- 2. Release the memory module cover.**

Insert a fingertip in the indentation in the bottom case assembly and lift the cover slightly; then slide the cover in the direction indicated by the arrow on the cover.

Memory Modules

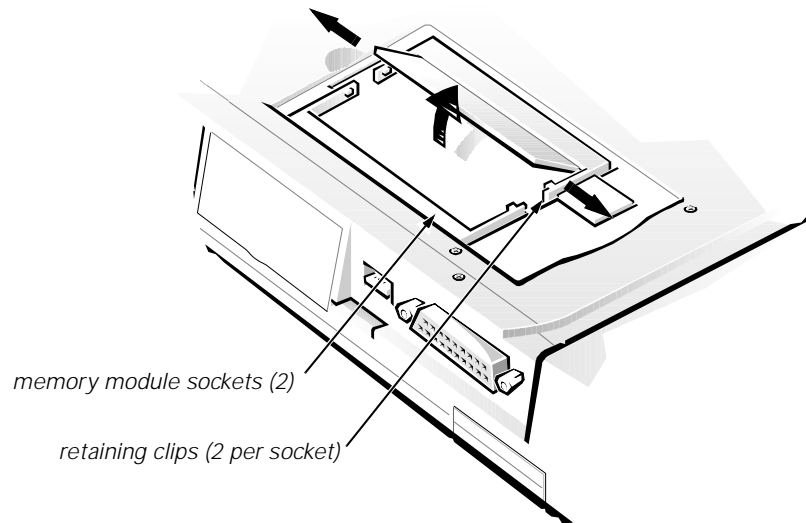


Figure 4-8. Memory Module Removal

- 1. Remove the memory module cover.**
- 2. To avoid possible damage to the memory module from ESD, ground yourself by touching the metal surface of an I/O connector on the computer's back panel.**
- 3. To release a memory module from its socket, gently push outward on each of the memory module's two metal retaining clips.**

The memory module should rotate upward out of its retaining clips.

- 4. Lift the memory module out of its socket.**

Memory modules can be installed only one way. Do not attempt to force the memory module into the socket. Align the notch near the center of the memory module with the corresponding key in the memory module socket.

Keyboard Assembly

To remove the keyboard assembly, follow these steps:



CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

1. **Close the display assembly, and turn the computer upside down on a flat work surface (see Figure 4-9).**

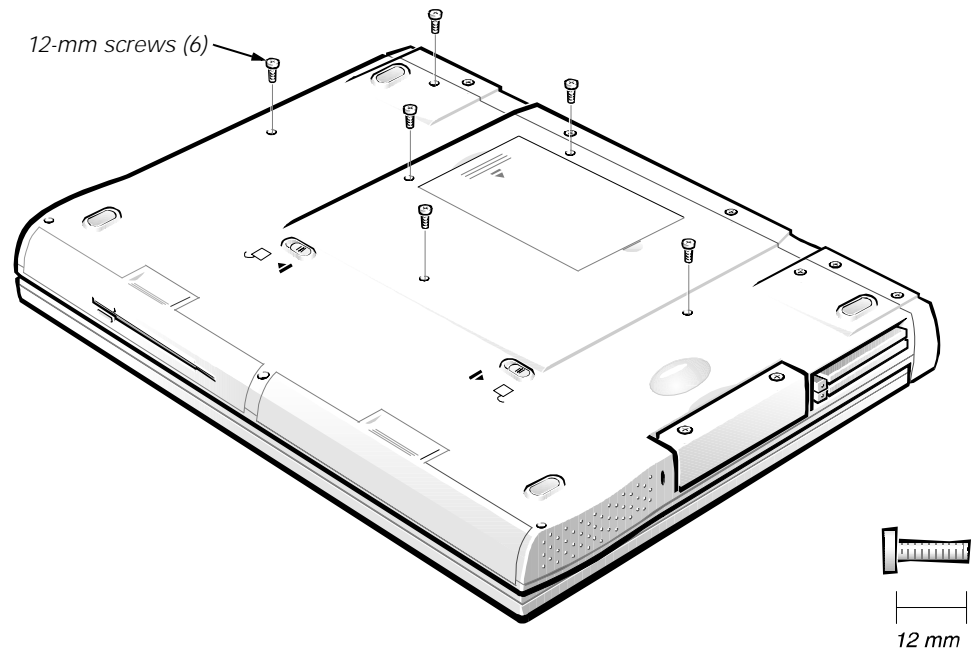


Figure 4-9. Removing the Keyboard Assembly Screws

2. **Remove the six 12-mm screws securing the keyboard to the computer.**
3. **Turn the computer right-side up and open the display.**



CAUTION: The keycaps on the keyboard are fragile, easily dislodged, and time-consuming to replace. Be careful when removing and handling the keyboard.

4. **Release the keyboard from the palmrest assembly:**

- a. Carefully deflect the palmrest (next to the blank key below the <Shift> key) away from the center of the keyboard, until the tab on the palmrest's inner edge disengages from the keyboard. The keyboard should raise up slightly.
- b. Insert a fingernail or a small flat-bladed screwdriver under the scalloped edge of the blank key (see Figure 4-10), and lift the right edge of the keyboard.

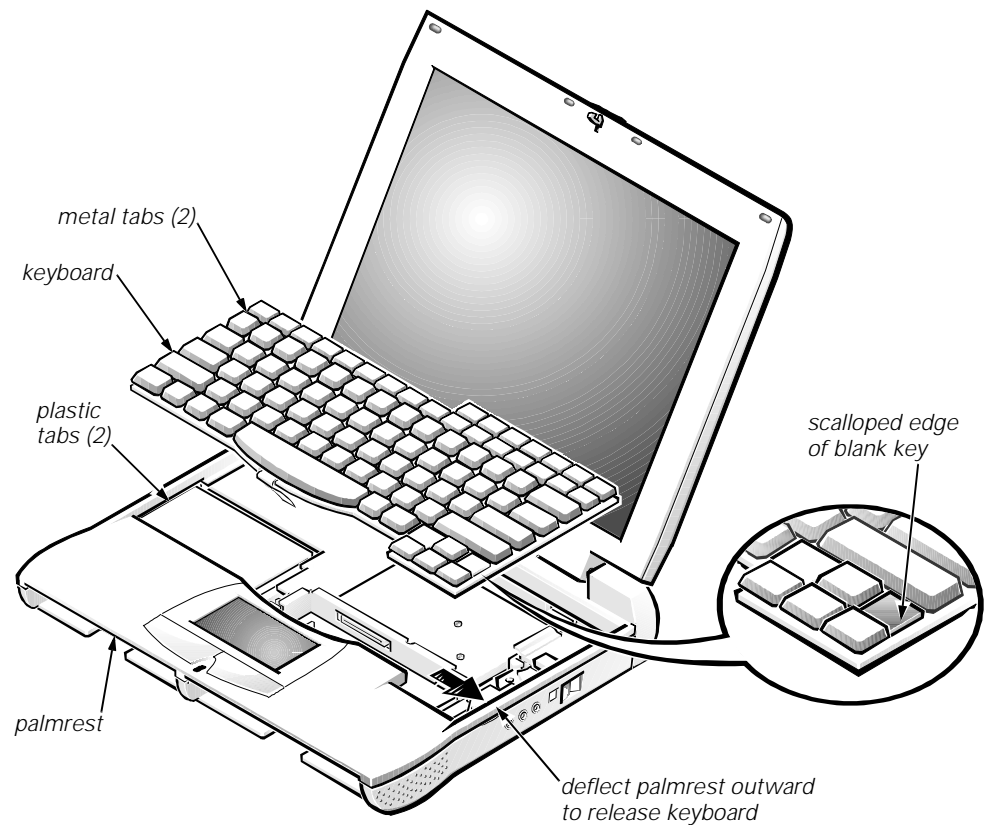


Figure 4-10. Keyboard Assembly Removal

- 5. Once the keyboard is fully released from the palmrest, place the keyboard upside down over the touch pad.**
- 6. Disconnect the keyboard cable from connector KB1 on the system board.**
- 7. Remove the keyboard assembly.**

Follow these steps when replacing the keyboard assembly:

- 1. Connect the keyboard cable to connector KB1 on the system board.**
- 2. Fit the left edge of the keyboard into place, making sure the two small metal tabs on the keyboard fit under the corresponding plastic tabs on the palmrest's inner edge.**
- 3. Lower the right edge of the keyboard into place, and press on the blank key below the <Shift> key until the tab on the palmrest's inner edge engages the keyboard with an audible "click."**
- 4. Check that the keyboard is correctly installed. The keys should be flush with the left and right surfaces of the palmrest.**
- 5. Reinstall the six 12-mm screws.**

Back Cover Assembly

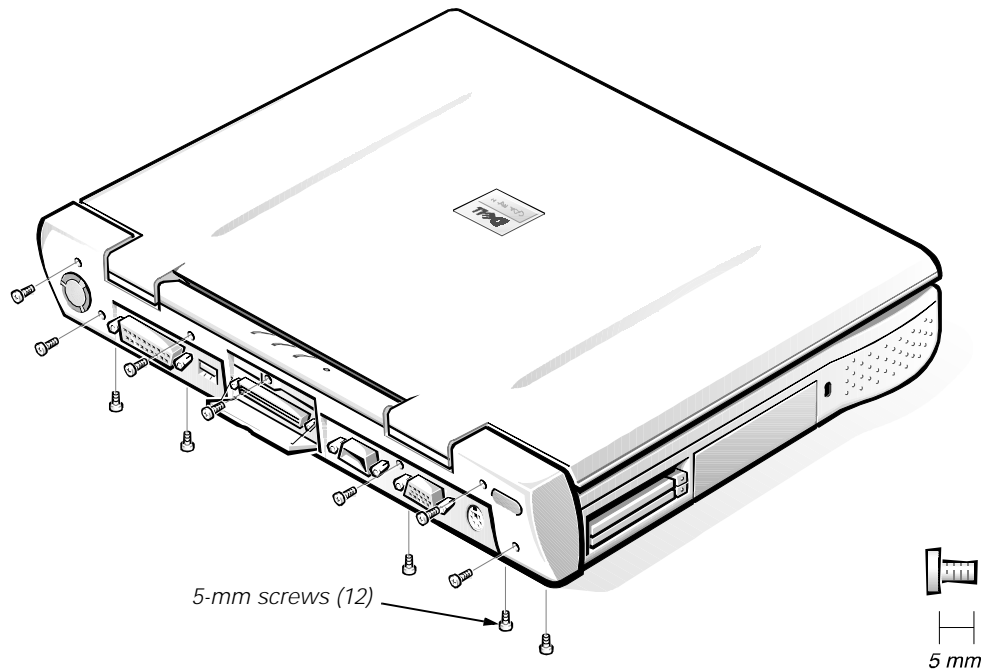


Figure 4-11. Back Cover Assembly Removal

- 1. Close the display.**
- 2. Remove the twelve 5-mm screws securing the back cover:**
 - Five screws on the underside of the back cover
 - One screw behind the docking connector door
 - Six screws on the face of the back cover
- 3. Close the docking connector door.**
- 4. Remove the back cover assembly.**

Grasp the right end of the back cover assembly firmly, and unsnap it from the computer. Then disengage the left end of the back cover assembly.

Palmrest Assembly

The palmrest assembly consists of the touch pad and the palmrest.

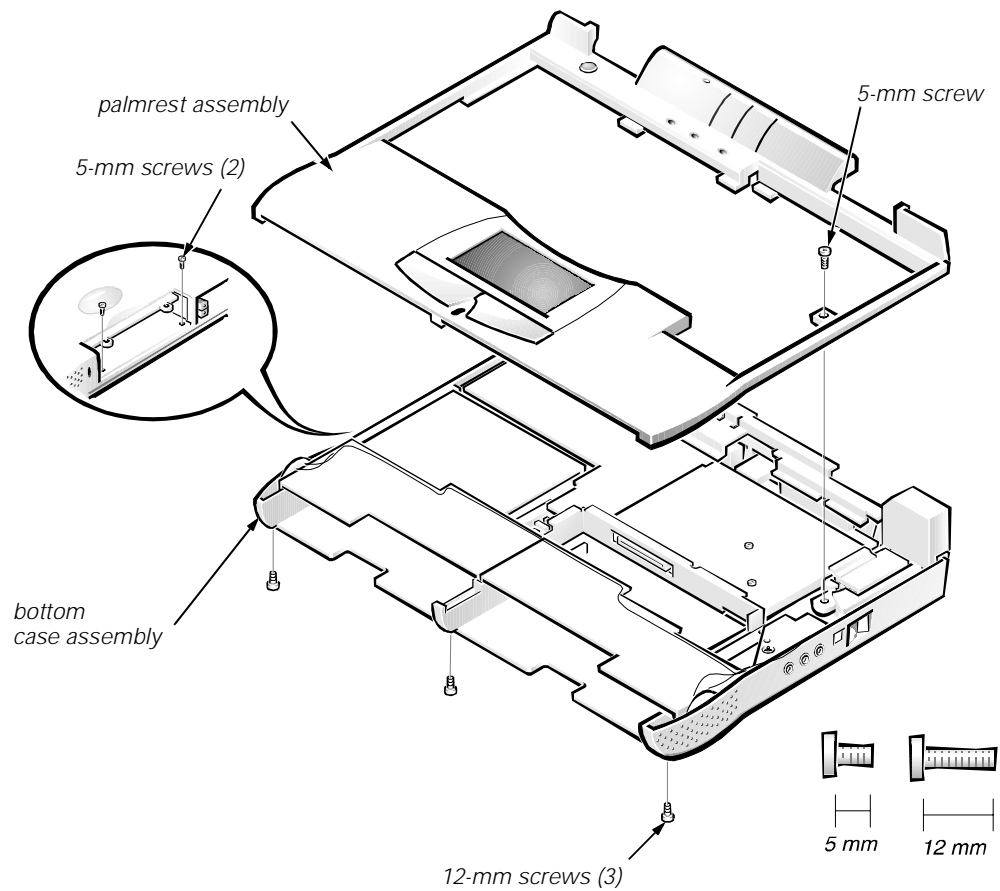


Figure 4-12. Palmrest Assembly Removal

- 1. Remove the keyboard.**
- 2. Disconnect the touch-pad cable from ZIF connector JP2 on the system board.**
- 3. Remove the back cover assembly.**
- 4. Remove the following screws securing the palmrest to the computer:**
 - One 5-mm screw inside the computer, adjacent to the thermal cooling assembly
 - Two 5-mm screws inside the upper edge of the hard-disk drive bay (you must remove the hard-disk drive to access these screws)
 - Three 12-mm screws underneath the front edge of the computer

5. Turn the computer right-side up on the work surface, and open the display assembly 180 degrees.



NOTE: Support the display assembly with a book or similar object so that the display assembly does not open beyond 180 degrees.

6. Carefully remove the palmrest assembly from the bottom case assembly.

The palmrest assembly is secured in the bottom case assembly by four snaps and tabs on the right and left ends of the palmrest. Take care not to damage the snaps when removing the palmrest.



*NOTE: When replacing the palmrest, ensure that the vertical tab at the back of the palmrest fits on the **outside** of the system board assembly, near the parallel port connector. Also, check that the microphone boot is properly located in its slot on the top EMI shield and is fitted within the palmrest assembly.*

Touch-Pad Interface Module

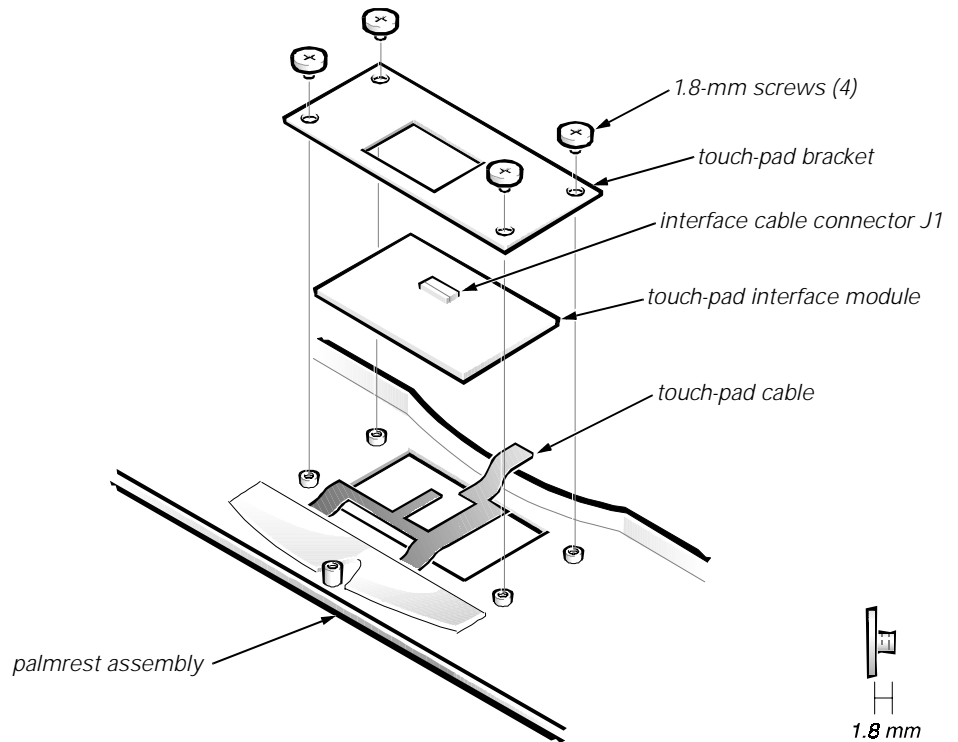


Figure 4-13. Touch-Pad Interface Module Removal

- 1. Remove the palmrest assembly.**
- 2. Turn the palmrest assembly upside down on a flat work surface.**
- 3. Remove the four 1.8-mm screws securing the touch-pad bracket.**
- 4. Carefully disconnect the touch-pad cable from ZIF connector J1 on the touch-pad interface module.**

To release the ZIF connector latch, use a fingernail to lift up the central portion of the black plastic latch.

- 5. Remove the touch-pad interface module from the palmrest.**

Power Button

- 1. Remove the palmrest assembly.**
- 2. Turn the palmrest assembly upside down on a flat work surface.**
- 3. Compress the two catches securing the power button, and remove the power button and spring from the palmrest assembly.**

Display Assembly Components

For removal purposes, the display assembly consists of the following components:

- Display assembly bezel
- LCD panel
- LCD inverter board
- LCD inverter board shield (13.3-inch display only)
- Display-assembly interface cable
- Display assembly latch
- Display assembly top-cover assembly
- Display assembly hinges
- Display assembly right bracket (12.1-inch display only)

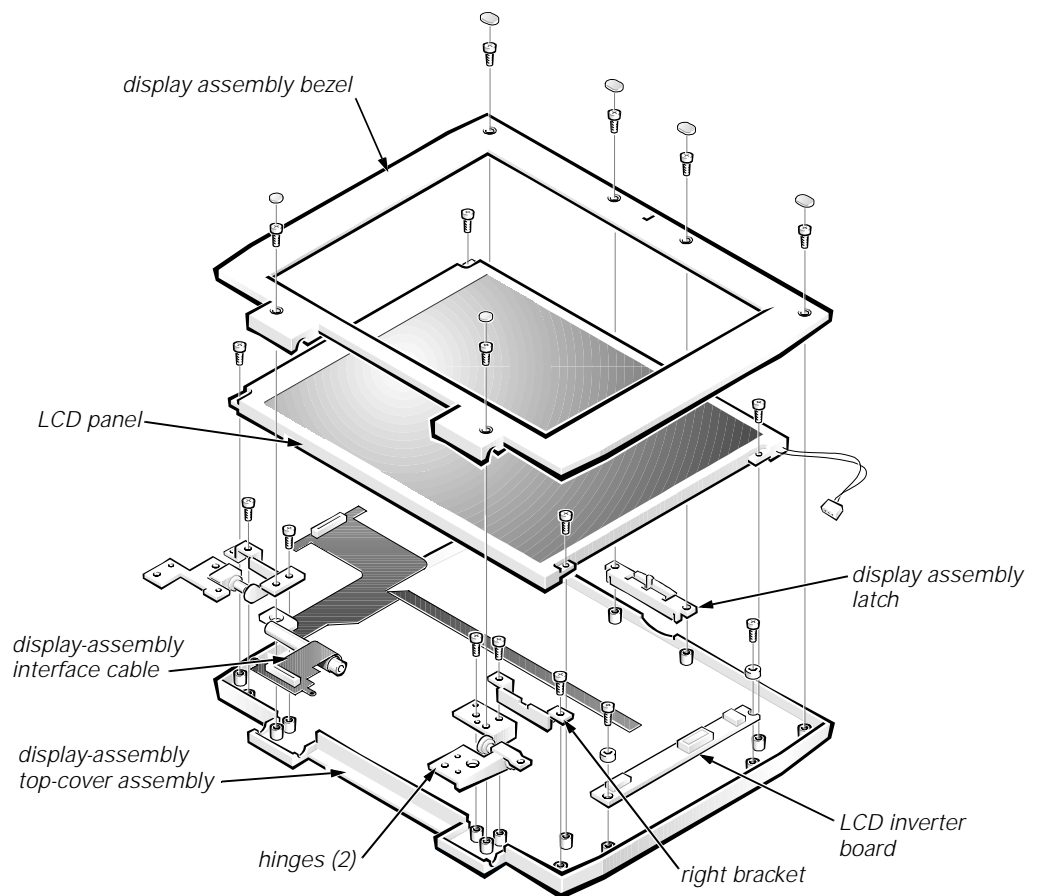


Figure 4-14. Exploded View—Display Assembly (12.1-Inch Display Shown)

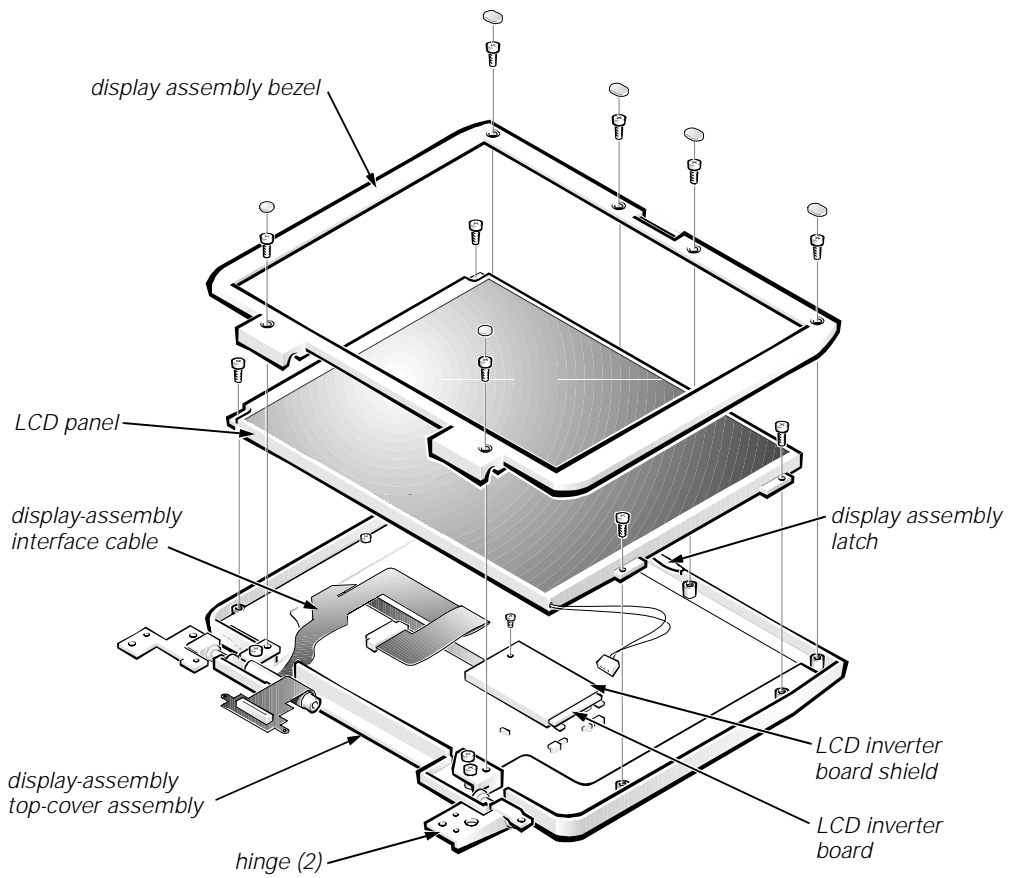


Figure 4-15. Exploded View—Display Assembly (13.3-Inch Display Shown)

Display Assembly

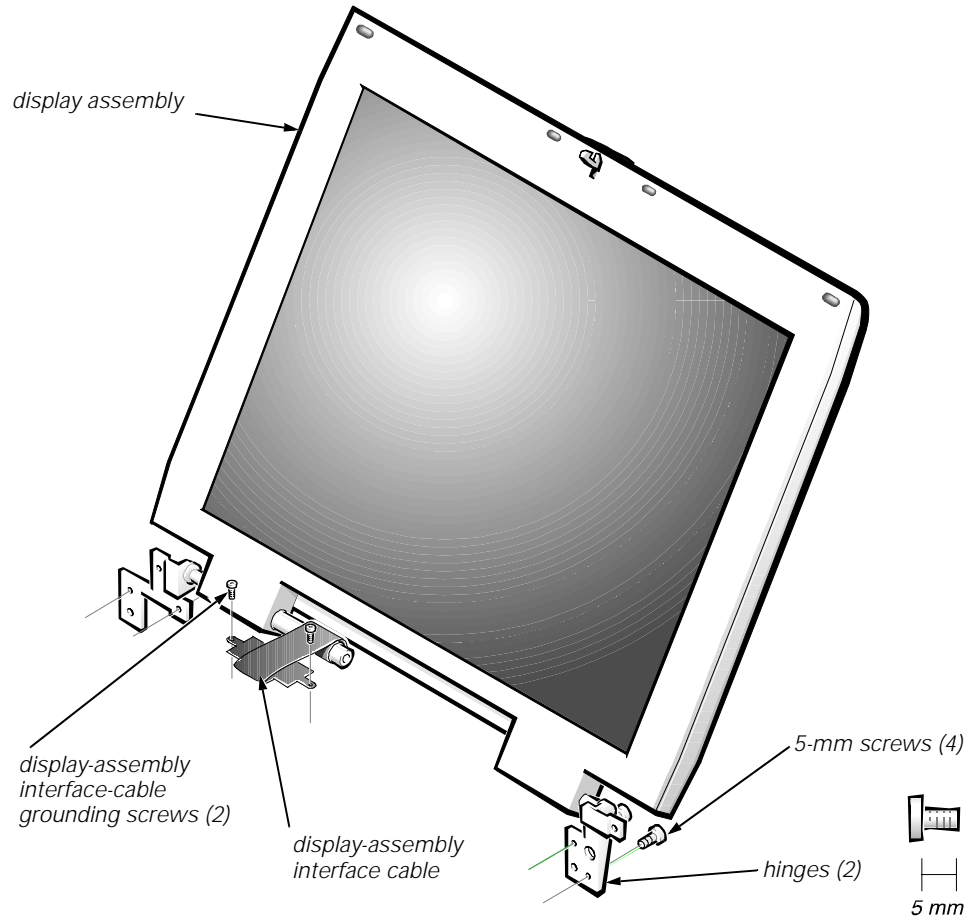


Figure 4-16. Display Assembly Removal

- 1. Remove the palmrest assembly.**
- 2. Remove the two 5-mm interface-cable grounding screws from the display-assembly interface cable.**
- 3. Disconnect the display-assembly interface cable from connector JP1 on the system board.**

Grasp the grounding tabs and pull the connector straight up from the system board.

- 4. Close the display, being careful not to damage the display interface cable.**

5. Remove the four silver 5-mm screws securing each of the two hinge brackets to the bottom case assembly.

6. Lift the display assembly from the bottom case assembly.



NOTE: When reinstalling the display assembly, install the four screws securing the hinges at the locations marked by arrows on the face of each hinge.



CAUTION: When reinstalling the interface-cable connector, be very careful not to insert the connector at an angle. Position the cable end over the connector and push the connector straight down—to prevent bending the connector pins.

Display Assembly Bezel

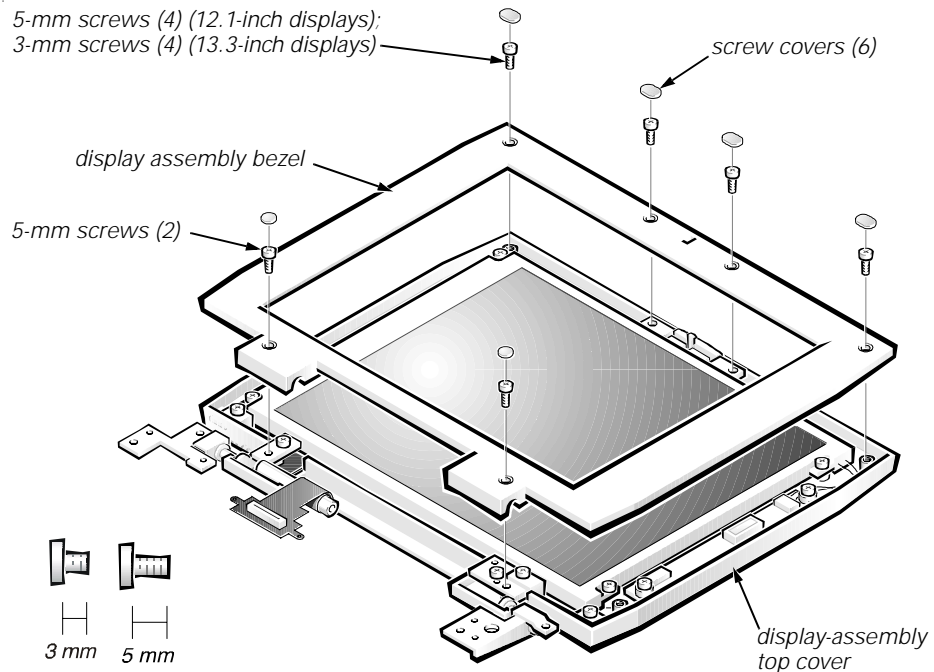


Figure 4-17. Display Assembly Bezel Removal (12.1-Inch Display Shown)

- 1. Use a scribe to carefully pry the screw covers out of the six screw holes in the bezel.**
- 2. Remove the six screws from the bezel.**

On 12.1-inch displays, all six screws are 5-mm screws. On 13.3-inch displays, the four upper screws are 3-mm screws, while the lower two screws are 5-mm in length.

- 3. Separate the bezel from the display-assembly top cover.**

If removing the bezel from a 12.1-inch display — The bezel is secured by snaps around all four of its edges. Insert your fingertips between the bezel and the LCD panel, and lift upward on the bezel to release the hidden snaps. Avoid pressing on the surface of the LCD panel.

If removing the bezel from a 13.3-inch display — The bezel is secured by snaps along its lower edge, and hooks along its right and left edges.

- Insert your fingertips between the lower edge of the bezel and the LCD panel, and lift upward on the bezel to release the hidden snaps.
- Lift the lower right corner of the bezel slightly, and then slide the bezel off of the display assembly until the hooks on the right and left edges release from the display-assembly top cover.

Display Assembly Latch

1. Remove the display assembly bezel.

2. Remove the display assembly latch:

- a. *If replacing the latch in a 12.1-inch display, lift the display assembly latch straight up from the display-assembly top cover.*
- b. *If replacing the latch in a 13.3-inch display, unsnap the latch and captive spring from the inside of the display assembly top-cover assembly.*

LCD Panel

The following subsections describe how to remove an LCD panel.

12.1-Inch LCD Displays

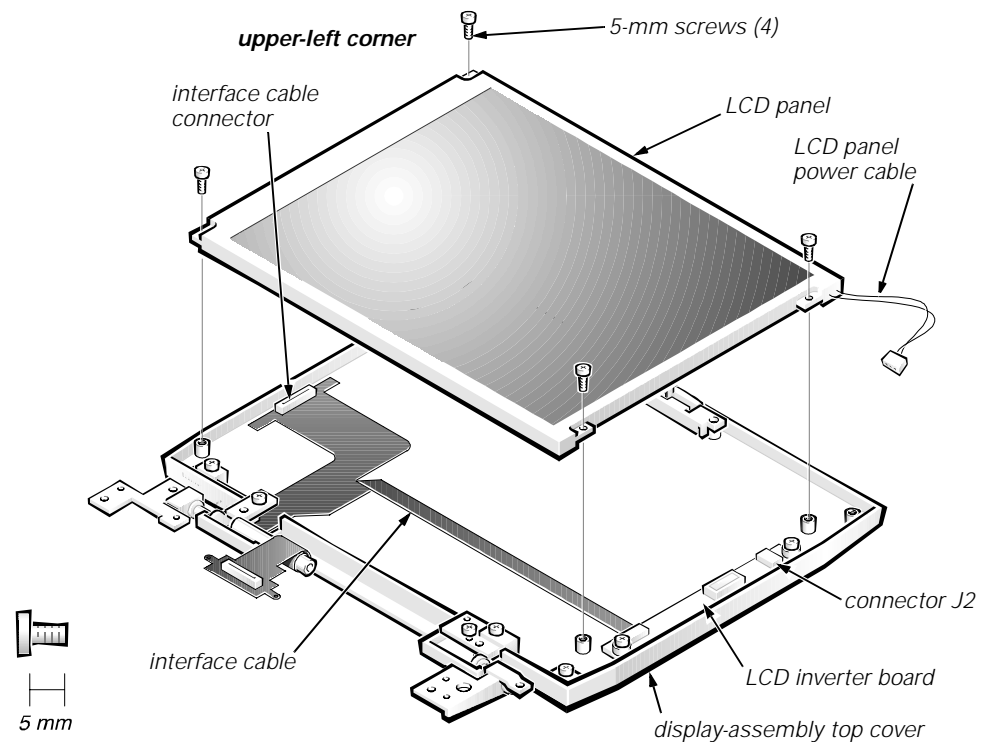


Figure 4-18. LCD Panel Removal (12.1-Inch Display)

1. Remove the display assembly bezel.
2. Remove the four silver 5-mm screws at the corners of the LCD panel.
3. Disconnect the LCD panel power cable from connector J2 on the LCD inverter board.
4. Lift the left edge of the LCD panel far enough to gain access to the the display-assembly interface cable connector on the underside of the LCD panel.
5. Using the two pull-tabs, disconnect the display-assembly interface cable from the LCD interface connector on the underside of the LCD panel.



CAUTION: When replacing the STN LCD panel on the Latitude CP M233SD, you must replace the screws at the four corners of the LCD panel in the following order or the panel may be damaged: first, reinstall the upper-right screw; second, reinstall the lower-left screw; third, reinstall the lower-right screw; and fourth, reinstall the upper left-screw.



NOTE: When replacing the LCD panel, ensure that the tabs on the display-assembly EMI shield fit over the four LCD panel mounting bosses. (This is necessary for adequate grounding of the LCD panel.)

13.3-Inch LCD Displays

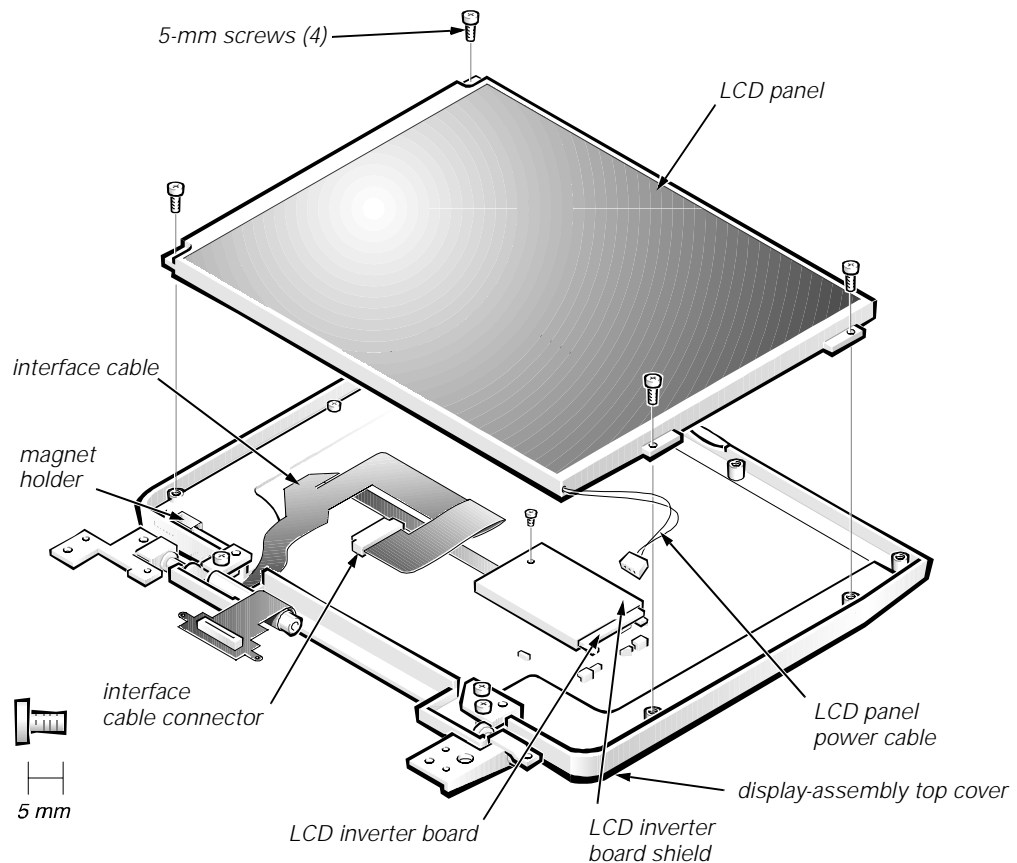


Figure 4-19. LCD Panel Removal (13.3-Inch Display)

- 1. Remove the display assembly bezel.**
- 2. Remove the four silver 5-mm screws at the corners of the LCD panel.**
- 3. Lift the upper edge of the LCD panel and pivot the panel up to gain access to the LCD inverter board in the display-assembly top cover.**
- 4. Remove the screw securing the LCD inverter board to the display-assembly top cover.**
- 5. Lift the LCD inverter board and inverter board shield far enough to disconnect the LCD panel power cable.**

6. Disconnect the display-assembly interface cable from the ZIF connector on the underside of the LCD panel.

To disconnect the cable, carefully work the cable connector free from the ZIF connector on the LCD panel. Do *not* pull on the LCD interface cable itself.

7. Before replacing the LCD panel, ensure that the correct magnet is installed in the magnet holder.

A magnet switch causes the computer to go into suspend mode when the display is closed. Failure to install the correct magnet in the magnet holder may prevent the computer from going into suspend mode. Begin by checking the back of the LCD panel for the manufacturer's label, and then follow the instructions for that manufacturer.

Sharp LCD Panel

Some revisions of the Sharp LCD panel have a magnetic frame and require a single, large magnet, or two small magnets with no foam spacer, for the magnet switch to operate properly. Other revisions of the Sharp LCD panel have a nonmagnetic frame and require a single, small magnet with a foam spacer. To identify the revision of the LCD you are working with, follow these steps:

- a. Remove the magnet from the magnet holder (see Figures 4-19 and 4-20), and place it against the replacement LCD panel frame.
- b. If the magnet sticks, the LCD panel has a magnetic frame. Place a single, large magnet, or 2 small magnets with no foam spacer, in the magnet holder.
- c. If the magnet does not stick, the LCD panel has a nonmagnetic frame. Place a single, small magnet and a foam spacer in the magnet holder, as shown in Figure 4-20. Place the magnet to the left of the foam spacer, assuming you are facing the display as shown in Figure 4-19.

Samsung LCD Panel

Place a single, small magnet and a foam spacer in the magnet holder, as shown in Figure 4-20. Place the magnet to the left of the foam spacer, assuming you are facing the display as shown in Figure 4-19.

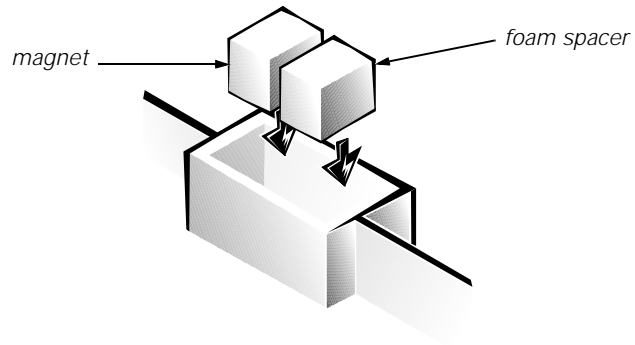


Figure 4-20. Magnet Holder



NOTE: When replacing the LCD panel, ensure that the tabs on the display-assembly EMI shield fit over the four LCD-panel mounting bosses. (This is necessary for adequate grounding of the LCD panel.)

LCD Inverter Board

The following subsections describe how to remove an LCD inverter board from a 12.1-inch or 13.3-inch LCD display.

12.1-Inch LCD Display

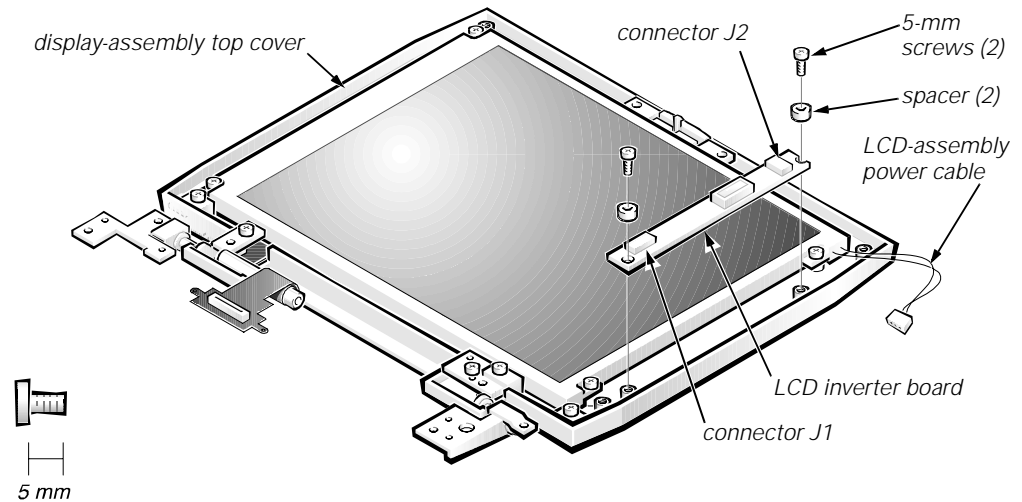


Figure 4-21. LCD Inverter Board Removal (12.1-Inch Display)

- 1. Remove the display assembly bezel.**
- 2. Disconnect the LCD-assembly power cable from connector J2 on the LCD inverter board.**
- 3. Disconnect the display-assembly interface cable from ZIF connector J1 on the LCD inverter board.**
- 4. Remove the two silver 5-mm screws and plastic spacers securing the LCD inverter board.**

Note the placement of the EMI shield over the lower screw boss, and the routing of the LCD-panel power cable around the upper screw boss.

- 5. Lift the LCD inverter board out of the display-assembly top cover.**



NOTE: When installing the inverter board, connect the LCD interface cable to the board prior to securing the board in the display-assembly top cover. After installing the inverter board, ensure that the LCD-panel power cable is routed around the plastic screw bosses in the display-assembly top cover.

13.3-Inch LCD Display

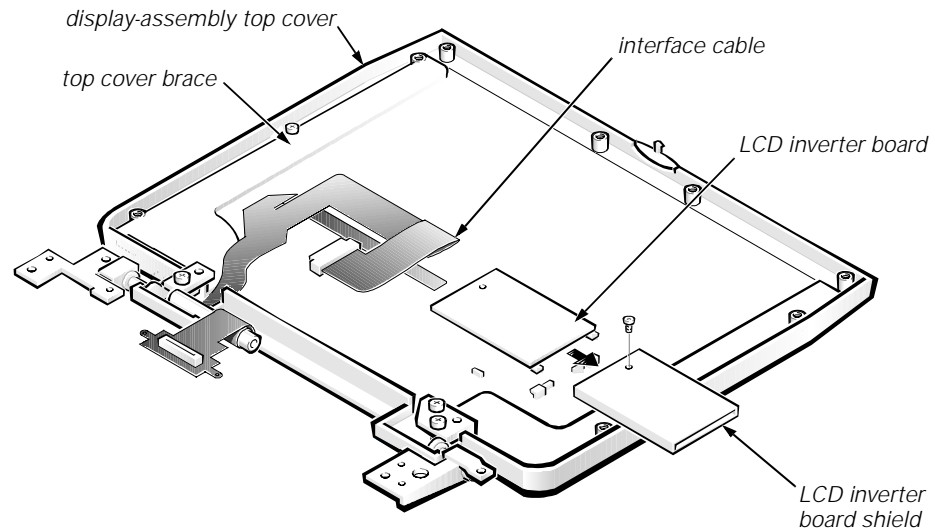


Figure 4-22. LCD Inverter Board Removal (13.3-Inch Display)

- 1. Remove the display assembly bezel.**
- 2. Remove the LCD panel.**
- 3. Disconnect the display-assembly interface cable from ZIF connector J1 on the LCD inverter board.**
- 4. Slide the LCD inverter board out of the LCD inverter board shield.**



NOTE: Replace the LCD inverter board in the shield so that the components on the board face towards the display-assembly top cover.

Display-Assembly Interface Cable

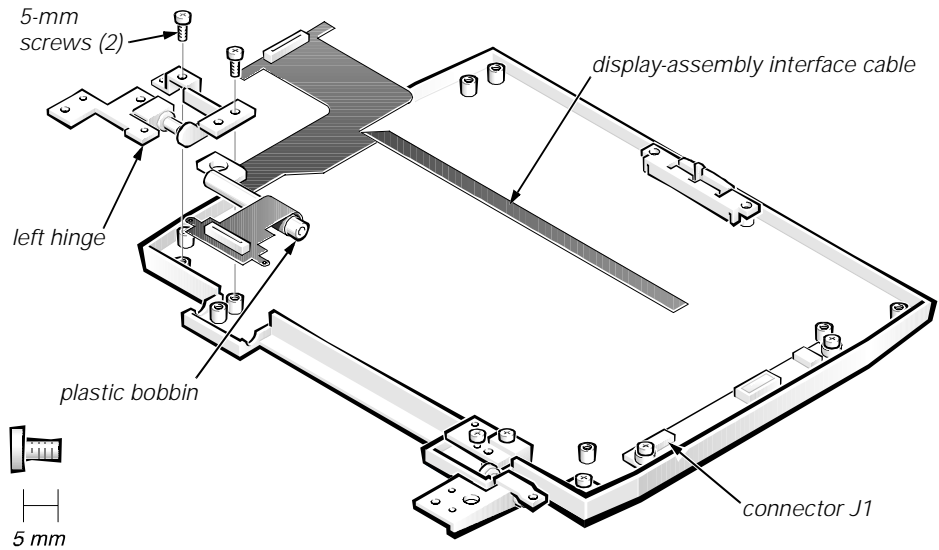


Figure 4-23. Display-Assembly Interface Cable Removal (12.1-Inch Display Shown)

- 1. Remove the display assembly.**
- 2. Remove the LCD panel.**
- 3. Disconnect the display-assembly interface cable from ZIF connector J1 on the LCD inverter board.**
- 4. Remove the two 5-mm screws securing the left hinge, and then remove the hinge from the display-assembly top cover.**
- 5. If you are removing the display-assembly interface cable from a 13.3-inch display, remove the left top-cover brace from the display-assembly top cover (see Figure 4-22).**

To remove the top cover brace, remove the 3-mm screw securing it.

- 6. Lift the display-assembly interface cable out of the display-assembly top cover.**



NOTE: When replacing the display assembly, reinstall the screws securing the left hinge at the locations marked on the hinge by arrows. Ensure that the display-assembly interface cable wraps once around the plastic bobbin before connecting the cable to the system board.

LCD Display Hinge

- 1. Remove the LCD display assembly from the computer.**
- 2. Remove the display assembly bezel.**
- 3. Remove the four silver 5-mm screws securing the two hinge brackets to the display-assembly top cover.**



NOTES: To aid in reinstalling the hinges and display assembly, the right and left hinges are marked by an "R" and an "L," respectively. Install the four screws securing the hinges at the locations marked by arrows on the face of each hinge.

The right bracket on a 12.1-inch display fits above the right hinge (see Figure 4-14).

Display-Assembly Top Cover

- 1. Remove the display assembly bezel.**
- 2. Remove the display assembly.**
- 3. Remove the LCD panel.**
- 4. Remove the LCD inverter board.**
- 5. Remove the display assembly latch.**
- 6. Remove the left and right hinges.**
- 7. Remove the right bracket (12.1-inch display only).**
- 8. Remove the display-assembly interface cable.**
- 9. If you are removing the display-assembly top cover from a 13.3-inch display, remove the right and left braces.**

To remove a brace, remove the 3-mm screw securing the brace to the display-assembly top cover.



NOTES: The replacement display-assembly top cover assembly includes two badges, one for Dell Latitude CP and one for the Dell Latitude CPi. Look at the old cover to determine which badge is appropriate, and then attach the appropriate badge to the new cover.

When reinstalling the display assembly, install the four screws securing the hinges at the locations marked by arrows on the face of each hinge.

Bottom Case Assembly

The bottom case assembly consists of the following field-replaceable components:

- Diskette drive assembly, CD-ROM drive assembly, or travel module
- Back cover assembly
- Audio shield
- Audio board
- Bottom case bracket
- Module latch assemblies
- Speakers
- System board assembly
- Thermal cooling assembly
- Air flow duct
- Exhaust fan
- I/R board
- Reserve battery

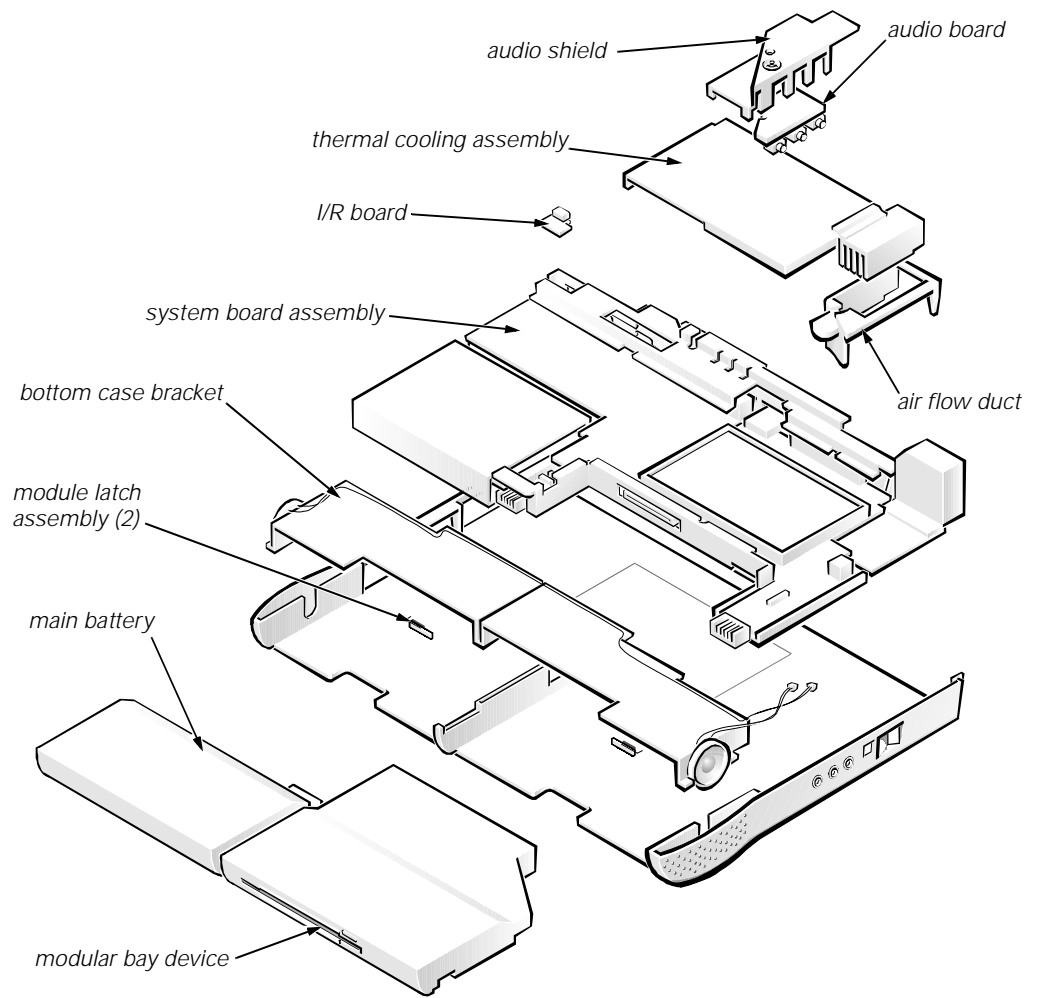


Figure 4-24. Bottom Case Assembly

Modular Bay Devices (Diskette Drive, CD-ROM Drive, Battery, or Travel Module)

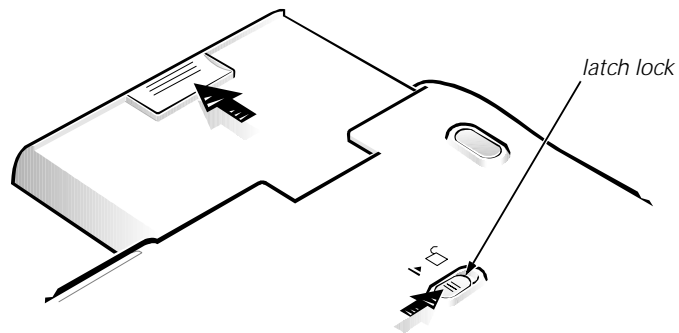


Figure 4-25. Modular Bay Device Removal



NOTE: You do not need to remove the main battery or hard-disk drive prior to this procedure.



CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

- 1. Close the display and turn the computer over**
- 2. Remove the device from the modular bay.**

Push the modular bay latch away from the center of the computer. Keep holding the latch open while pulling the device out of the modular bay with the other hand.

Audio Shield

- 1. Remove the palmrest assembly.**
- 2. Remove the 5-mm screw securing the audio board shield (see Figure 4-26).**
- 3. Remove the audio board shield.**



NOTE: When replacing the audio shield, ensure that the audio shield is properly seated to prevent it from cutting into the speaker wires or interfering with devices installed in the modular bay. (You can check this by temporarily installing a device in the modular bay prior to reinstalling the palmrest assembly.)

Audio Board

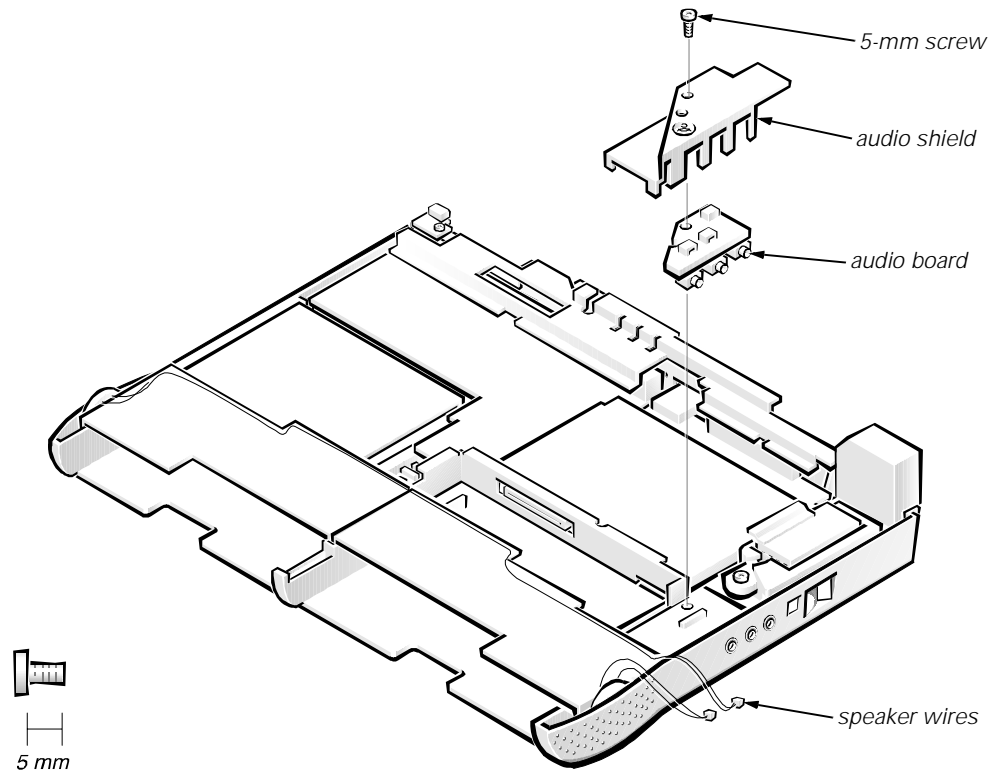


Figure 4-26. Audio Board Removal

- 1. Remove the palmrest assembly.**
- 2. Remove the 5-mm screw securing the audio board shield.**
- 3. Remove the audio board shield.**
- 4. Disconnect the speaker wires and microphone wires from their connectors on the audio board.**

The connectors are fragile—do not pull on the wires to disconnect them.

- 5. Remove the audio board from the bottom case.**



NOTE: When replacing the audio shield, ensure that the audio shield is properly seated to prevent it from cutting into the speaker wires or interfering with devices installed in the modular bay. (You can check this by temporarily installing a device in the modular bay prior to reinstalling the palmrest assembly.)

Bottom Case Bracket

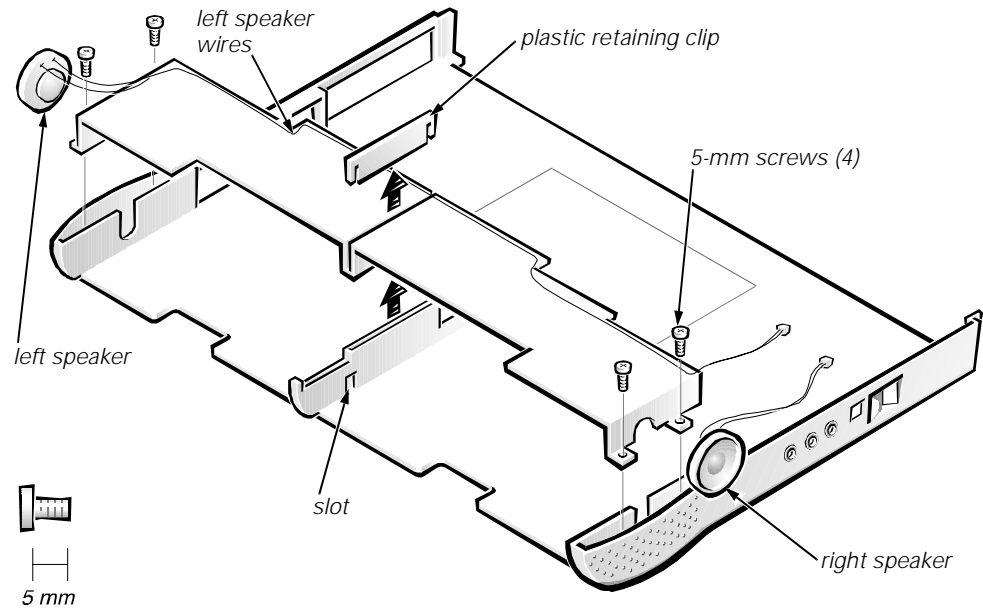


Figure 4-27. Bottom Case Bracket Removal

- 1. Remove the palmrest assembly.**
- 2. Remove the audio board shield.**
- 3. Disconnect the speaker wires from connectors JP1 and JP2 on the audio board.**

The connectors are fragile—do not pull on the speaker wires to disconnect them.

- 4. Remove the two 5-mm screws at each end of the bottom case bracket.**
- 5. Insert the end of a small flat-bladed screwdriver into the slot in the vertical support in the center of the bottom case, and disengage the plastic retaining clip.**
- 6. Lift the bottom case bracket from the computer.**



NOTE: When replacing the bottom case bracket, follow these guidelines to prevent damage to the speaker wires:

- *Orient each speaker in the bottom case so that its wires are facing upwards.*
- *Route the speaker wires under their respective retaining clips on the bottom case bracket.*

Module Latch Assemblies

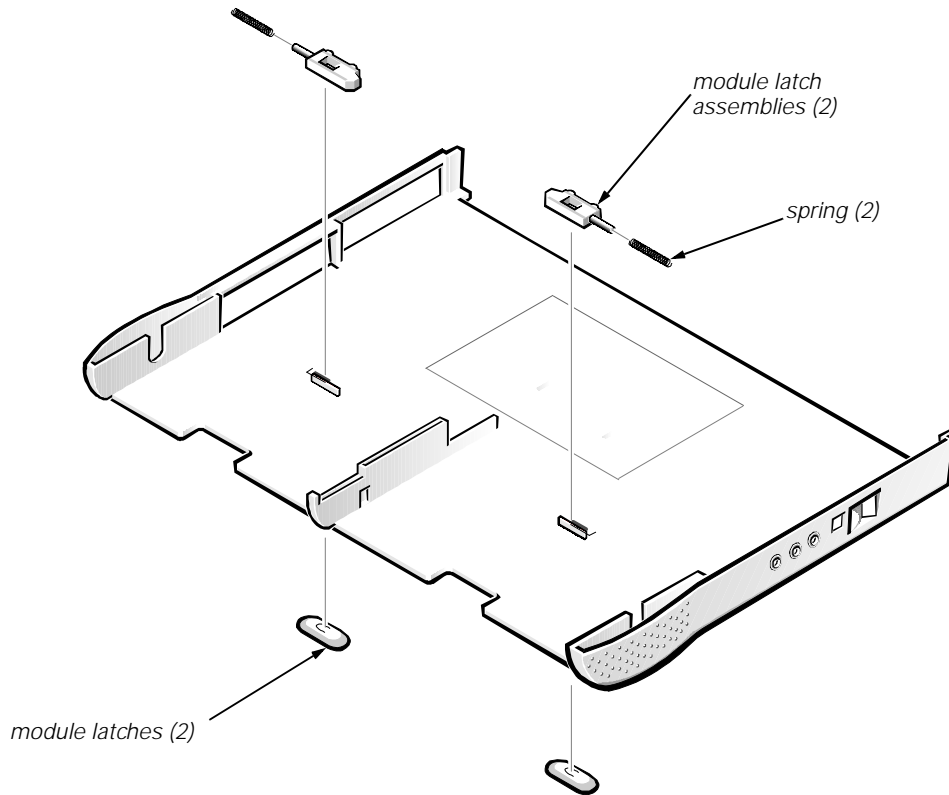


Figure 4-28. Module Latch Assemblies Removal

- 1. Remove the bottom case bracket.**
- 2. Remove the left latch from the outside of the bottom case by unsnapping the slider-spring assembly.**

Keep pressure applied to the slider-spring assembly while unsnapping the latch to prevent the slider-spring assembly from coming loose from the case. If the slider-spring assembly does come loose from the case:

- Carefully reinsert the spring onto the plunger on the slider, and reinstall the slider-spring assembly into the holding features on the inside of the case.
 - Ensure that the plunger is inserted in its respective hole, that the side of the slider with the two bumps is facing the rear of the case, and that the surface with the wear ribs is facing the bottom of the case (see Figure 4-29).
- 3. Snap in the new latch from the bottom of the base, making certain its snap features are fully engaged in the slider.**
 - 4. Ensure that the newly installed latch moves smoothly and freely when pushed and released.**

5. Repeat steps 1–4 for the right latch.
6. On the base plastic, find the molded label “P.N. ASSY 89501”; then, using a permanent marker, write “A01” to the right of “89501.”

This revision mark indicates that the latch rework is complete.

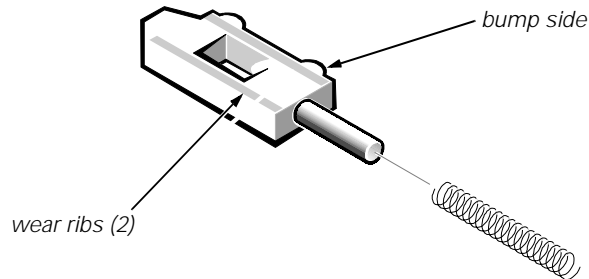


Figure 4-29. Left Slider

Speakers

1. Remove the bottom case bracket.
2. If you are replacing the left speaker, carefully remove the speaker wires from the retaining clips along the bracket's edges.
3. Remove the speaker from the bottom case bracket.



NOTES: When replacing the speaker, follow these guidelines to prevent damage to the speaker wires:

- Orient the speaker in the bottom case so that the speaker wires are facing upwards.
- Route the speaker wires under their retaining clips on the bottom case bracket.

System Board Assembly

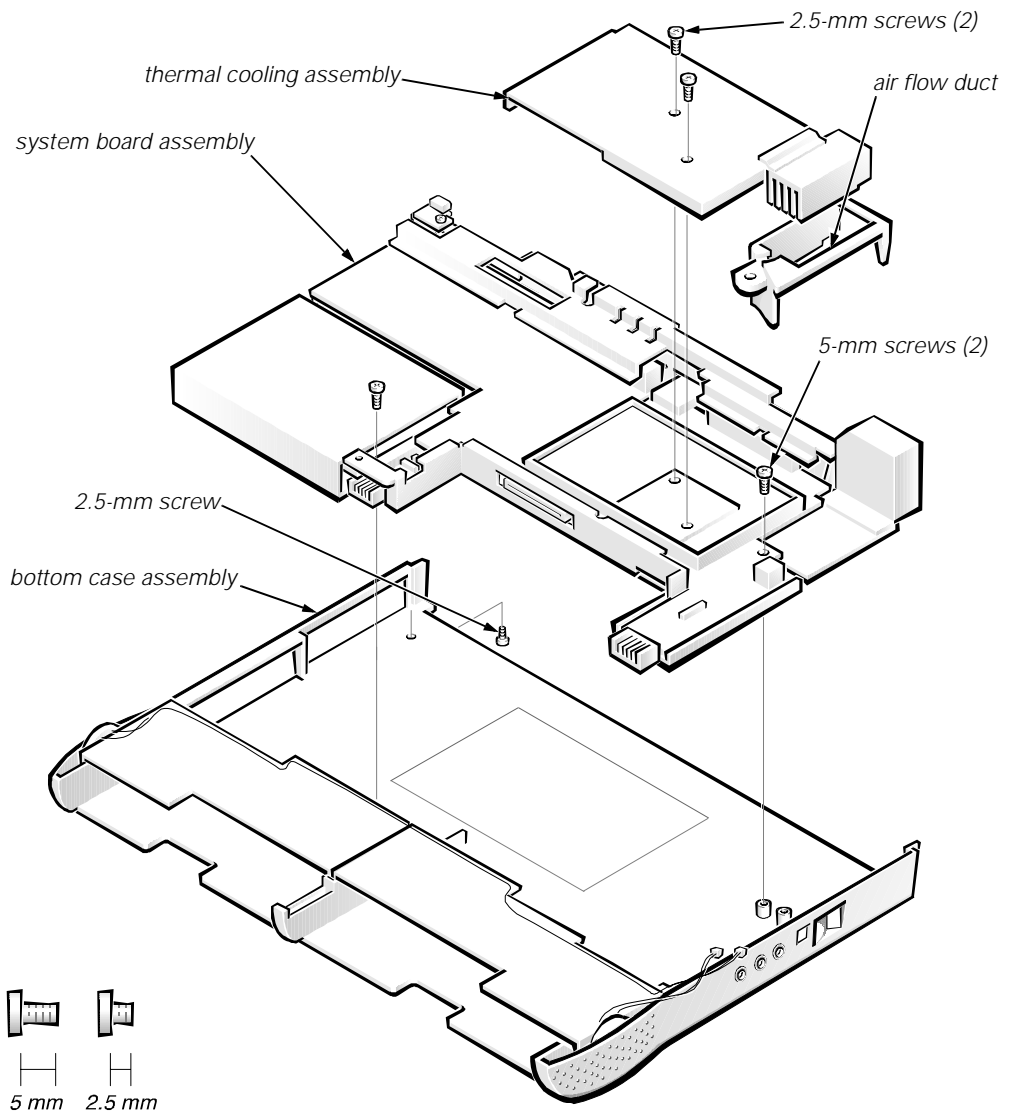


Figure 4-30. System Board Assembly Removal

The system board's BIOS chip contains the system service tag number, which is also visible on a bar-code label on the bottom of the computer. The replacement kit for the system board assembly includes a diskette that provides a utility for transferring the service tag number to the replacement system board assembly.

- 1. Remove the palmrest assembly.**
- 2. Remove the LCD display assembly.**
- 3. Remove the audio board.**
- 4. Remove the two 2.5-mm screws securing the thermal cooling sub-assembly to the microprocessor module.**



CAUTION: To ensure maximum cooling for the microprocessor, do not touch the heat transfer areas on the thermal cooling assembly. The oils in your skin reduce the heat transfer capability of the thermal pads.

5. **Remove the thermal cooling subassembly from the microprocessor module.**
6. **Remove the air flow duct.**
7. **Verify that the PC Card ejectors do not extend from the PC Card bay.**
8. **Remove the 2.5-mm screw from the center of the computer's left rear foot.**
9. **Remove the following two screws from the system board assembly (see Figure 4-30):**

- The 5-mm screw near the reserve-battery cable connector
- The 5-mm screw near the microprocessor module

10. Lift the system board assembly out of the bottom case assembly.

Be sure and transfer the memory module(s) to the replacement system board assembly. If you are replacing the thermal cooling assembly with a new one, remove any lining present on the thermal pad before installing the new thermal cooling assembly.

After replacing the system board assembly, be sure to enter the system's service tag number into the BIOS of the replacement system board assembly. Insert the diskette that accompanied the replacement system board assembly into the diskette drive, and turn on the computer. Follow the instructions on the display screen.

Exhaust Fan

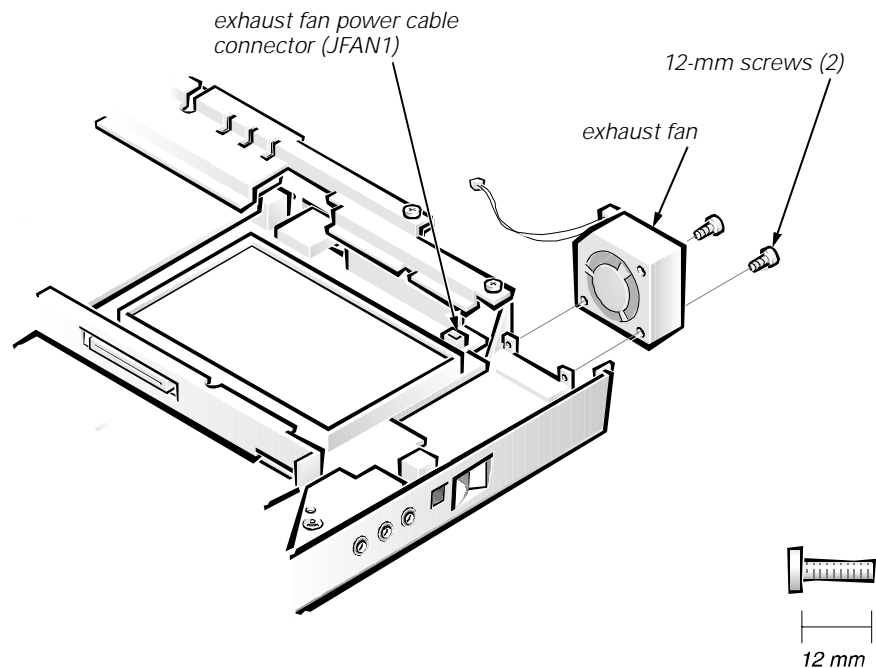


Figure 4-31. Exhaust Fan Removal

- 1. Remove the palmrest assembly.**
- 2. Disconnect the exhaust fan power cable from connector JFAN1 on the system board.**
- 3. Remove the two 12-mm screws securing the exhaust fan, and then remove the exhaust fan.**



NOTE: When replacing the exhaust fan, orient the fan such that the fan label faces outward and the power cable is at the upper right corner of the fan (when viewed from the back of the computer). (This will prevent the fan wires from being pinched when you reassemble the computer.) Make sure that the wires are routed below the upper EMI shield.

I/R Board

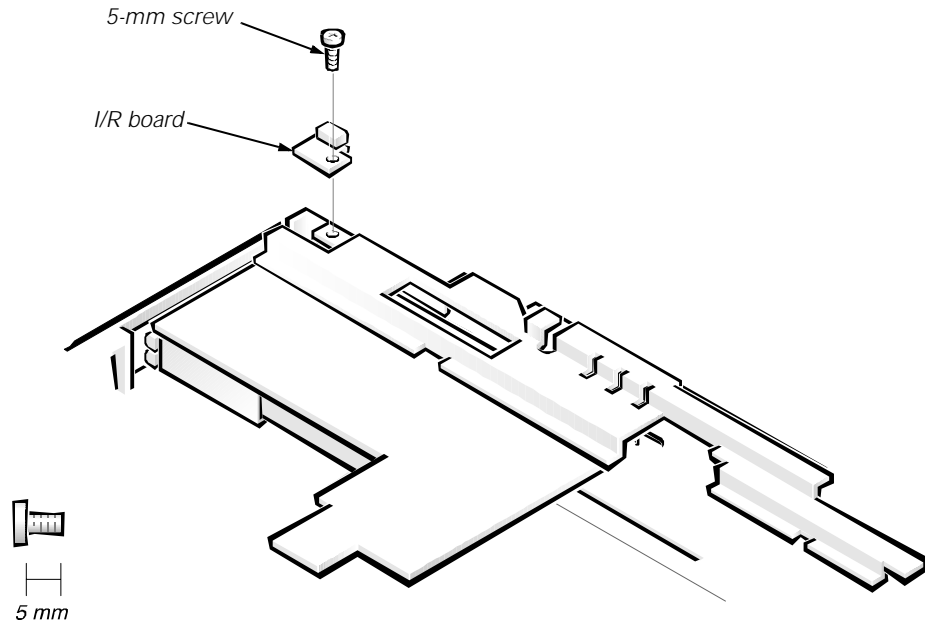


Figure 4-32. I/R Board Removal

- 1. Remove the palmrest assembly.**
- 2. Remove the 5-mm screw securing the I/R board to the system board assembly.**
- 3. Lift the I/R board straight up from the system board assembly.**

Reserve Battery

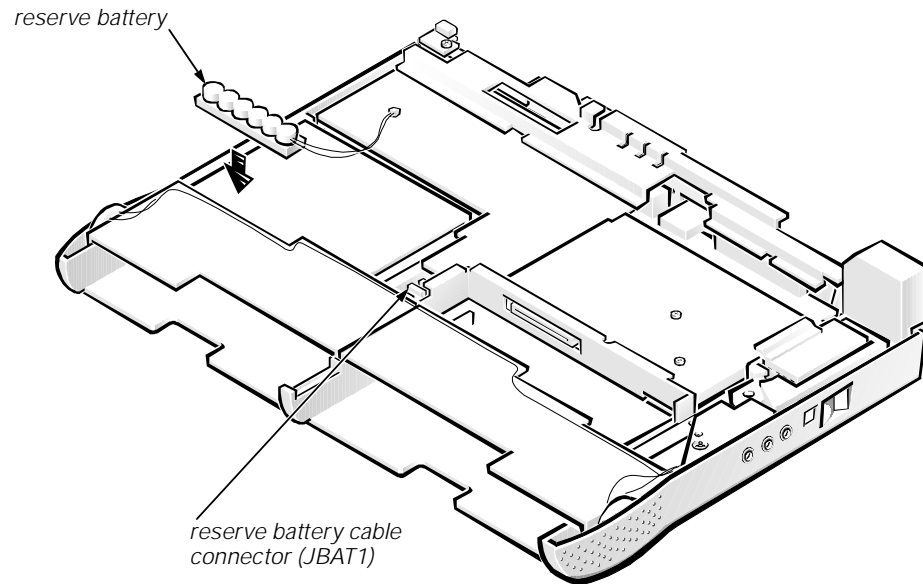


Figure 4-33. Reserve Battery Installation



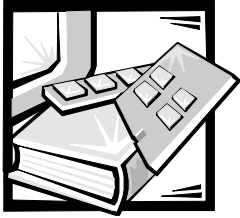
CAUTION: The reserve battery provides power to the computer's RTC and NVRAM when the computer is turned off. Removing the battery causes the computer to lose its date and time information as well as all user-settable parameters in NVRAM. If possible, make a copy of this information before you remove the reserve battery.

To remove the reserve battery, follow these steps:

- 1. Remove the palmrest assembly.**
- 2. Disconnect the reserve battery cable from connector JBAT1 on the system board.**
- 3. Remove the reserve battery from the bottom case bracket.**
 - a. Tear the reserve battery free from the foam pad.
 - b. Remove the remnants of the foam pad from the system board assembly.



NOTE: When replacing the reserve battery, first connect the reserve battery cable to the system board. Then position the reserve battery on the hard-disk drive bay so there is minimal slack in the cable.



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