



HP OmniBook XE3



Service Manual

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Introduction

This manual provides reference information for servicing the HP OmniBook XE3 notebook PC. It is for use by HP-authorized service personnel while installing, servicing, and repairing these products.

The manual is designed as a self-paced guide that will train you to install, configure, and repair XE3 notebooks. The manual is self-contained, so you can follow it without having equipment available.

The following table lists other sources of information about the notebook and related products.

Source	Address or Number	Comments
HP Notebook Web Site	http://www.hp.com/notebooks http://www.europe.hp.com/notebooks (European mirror)	No usage restriction.
HP Partnership Web	http://partner.americas.hp.com	Restricted to Authorized Resellers only.
HP Asia Pacific Channel Support Centre for DPSP Partners	http://www.hp.com.au	Restricted to DPSP Partners only.
HP/MCD Web Site	http://www.mcd.hp.com	HP's internal web site for division information.
America Online	Keyword: HP	Call (800) 827-6364 for membership within the US.
CompuServe	GO HP	Call (800) 524-3388 for membership within the US.
HP Support Assist CD-ROM	(800) 457-1762	US and Canada.
	(801) 431-1587	Outside US and Canada.
Microsoft Windows manual		Information about Windows operating system.
Microsoft Web	http://www.microsoft.com	Information and updates for Windows operating systems.

Product Information

The OmniBook XE3 series is HP's value all-in-one business notebook computer, targeted at small- to medium-sized businesses. It combines affordability, value, ease-of-use, and quality in a convenient package that integrates easily into any SMB environment at a wide range of prices. It also incorporates several new technologies and an enhanced industrial design for greater ease-of-use, quality, and reliability.

Table 1-1. OmniBook XE3 Series Models

Product ¹	CPU ²	Display	Hard Drive	Standard SDRAM	CD-ROM/DVD (max. speed)	Mini-PCI Card ³	Battery	OS ⁴
F2112X	Celeron 550 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	Modem	NiMh	98/2K
F2113X	Celeron 600 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	Modem	Lilon	98/2K
F2114X	Pentium III 650 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	Modem	Lilon	98/2K
F2115X	Celeron 650 MHz	14.1-in TFT XGA	5 GB	64 MB	8x DVD	Modem/LAN	Lilon	98/2K
F2116X	Pentium III 700 MHz	14.1-in TFT XGA	10 GB	64 MB	8x DVD	Modem/LAN	Lilon	98/2K
F2117X	Pentium III 700 MHz	15.0-in TFT XGA	10 GB	64 MB	8x DVD	Modem/LAN	Lilon	98/2K
F2118X	Pentium III 700 MHz	15.0-in TFT XGA	10 GB	128 MB	8x DVD	Modem/LAN	Lilon	98/2K
F2119X ⁵	Celeron 600 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	Modem/LAN	Lilon	98/2K
F2120X ⁵	Pentium III 650 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	Modem/LAN	Lilon	98/2K
F2121X ⁶	Celeron 600 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	None	Lilon	98/2K
F2122X ⁶	Pentium III 650 MHz	12.1-in TFT SVGA	5 GB	64 MB	24x CD-ROM	None	Lilon	98/2K
F2123X ⁶	Celeron 650 MHz	14.1-in TFT XGA	5 GB	64 MB	8x DVD	None	Lilon	98/2K
F2124X ⁶	Pentium III 700 MHz	15.0-in TFT XGA	10 GB	64 MB	8x DVD	None	Lilon	98/2K
F2126X ⁷	Celeron 600 MHz	14.1-in TFT XGA	10 GB	64 MB	24x CD-ROM	Modem/LAN	Lilon	98/2K

This table lists only base product configurations—custom configurations are not included.

¹ For the products listed:

"x" suffix means

"W", "WT", or "WG" for Windows 95 or Windows 98 installed, or

"K", "KT", or "KG" for Windows 2000 installed (marketing distinction only).

² Intel Mobile Pentium III or Intel Mobile Celeron processor.

³ All modems 56K. All LAN support Ethernet 10Base-T (10 Mbps) and 100Base-T (100 Mbps).

⁴ OS = Windows 98 (98), Windows 2000 (2K), or Windows Millennium Edition (ME).

⁵ North America (U.S.) only.

⁶ Europe only (modemless).

⁷ Japan only.

Technology Codes

HP does not change the name of a product every time the product's technology changes. While this helps ensure continuing market momentum for HP products, it complicates technology deployment and support processes.

To help solve this problem, HP has added a technology code to the serial number of each of its products. Since the BIOS must be matched to the notebook's hardware, the same code is used for the BIOS and the hardware. This manual refers to technology code deferences where applicable.

The table below shows the technology codes and the changes they signify for the products. Before downloading software or drivers or performing repairs, note the technology code for the HP notebook model.

Note that the first two characters of the BIOS ID (for example, **GC**.M1.02) indicate the hardware technology. You can also determine the BIOS ID using the BIOS Setup Utility, or by pressing ESC during the boot process when the HP logo appears.

This manual contains service information for products having the following technology codes.

Technology code	Product name	Details
GC	OmniBook XE3 Pavilion Notebook N5130/50/70/90/95	Initial platform technology.

Features

The following illustrations show the notebook's main external features. For an exploded view of the notebook, see page 4-2.

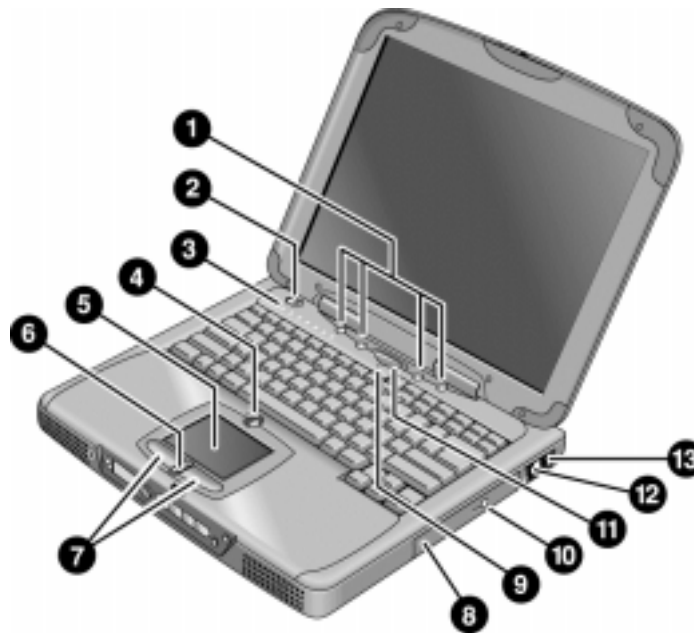


Figure 1-1. Top/Right View

- | | |
|---|--|
| 1. One-Touch buttons. | 7. Click buttons. |
| 2. Power button. | 8. CD-ROM or DVD drive. |
| 3. Status lights (left to right: power status, battery status, caps lock, num lock, scroll lock, floppy drive access, hard drive access, CD-ROM or DVD access. See page 1-7). | 9. Built-in microphone. |
| 4. Pad Lock touch pad on/off button. | 10. CD-ROM or DVD eject button. |
| 5. Touch pad (pointing device). | 11. Standby button (blue). Suspends and resumes operation. |
| 6. Scroll up/down toggle. | 12. Modem port (on certain models). |
| | 13. LAN port (on certain models). |

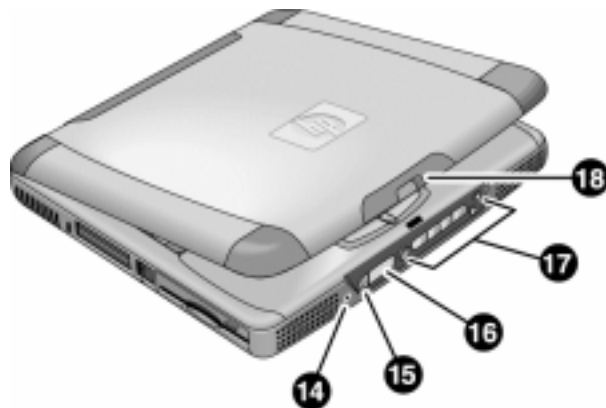


Figure 1-2. Front View

- | | |
|--------------------------------------|------------------------------|
| 14. Headphone jack. | 17. Multimedia buttons. |
| 15. Status panel mode select button. | 18. Latch (to open display). |
| 16. Status panel. | |



Figure 1-3. Rear/Left View

- | | |
|---|---|
| 19. AC adapter jack. | 26. Two USB ports. |
| 20. PS/2 port (external mouse or keyboard). | 27. Microphone jack. |
| 21. Serial port. | 28. Kensington lock slot (security connector). |
| 22. Parallel port. | 29. PC card slots (upper and lower). |
| 23. VGA port (external monitor). | 30. System-off switch (for resetting notebook). |
| 24. Infrared port. | 31. PC card eject buttons. |
| 25. TV output port. | 32. Floppy disk drive. |

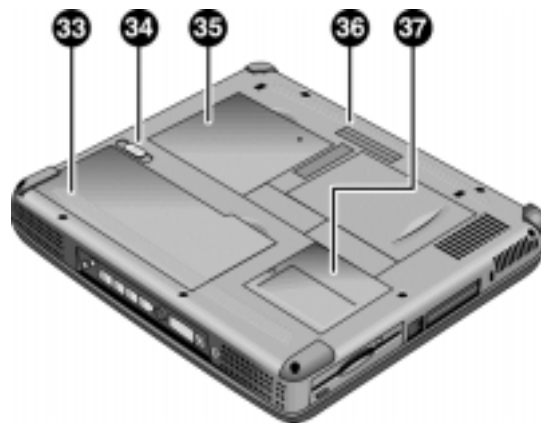


Figure 1-4. Bottom View

33. Battery.

34. Battery latch.

35. SDRAM cover.

36. Port replicator (docking) connector.

37. Mini-PCI card cover.

Operation

This section gives an overview of the notebook's operation.

Turning the Notebook On and Off

You can start and stop the notebook using its power button or blue standby button. However, at times you may want to use certain methods to start or stop the notebook—depending on power considerations, types of active connections, and start-up time.

Table 1-1. Activating Power Modes

Power mode	To enter this mode	To turn on again
Display-off mode (Power status LED stays green.) Saves minimal power. Turns off display and hard disk. Restarts quickly. Maintains network connections.	Allow timeout.	Press any key or move a pointing device to restore the display ("Instant On").
Standby mode (Power status LED turns amber.) Saves significant power. Turns off display, hard drive, and other components. Maintains current session in SDRAM. Restarts quickly. Restores network connections.	Press the blue standby button —or— click Start, Shutdown, Standby —or— allow timeout (Windows 98 only).	Press the blue standby button to display your current session ("Instant-On").
Hibernate mode (Power status LED turns off.) Saves maximum power. Saves current session to disk, then shuts down. Restores network connections.	Press Fn+F12 —or— Click Start, Shut Down, Hibernate (Windows 2000 only) —or— allow timeout (Windows 98 only).	Press the blue standby button to restart and restore your previous session.
Shut down (off) (Power status LED turns off.) Saves maximum power. Turns off without saving current session. At startup, resets everything, starts a new session, and restores network connections with mini-PCI card, and with some PCMCIA cards.	Click Start, Shut Down, Shut down (recommended) —or— slide the power button.	Press the blue standby button to restart with a new session.

Checking the Notebook's Status

The notebook's status lights—located above the keyboard—report power and battery status, keyboard status, and drive activity.

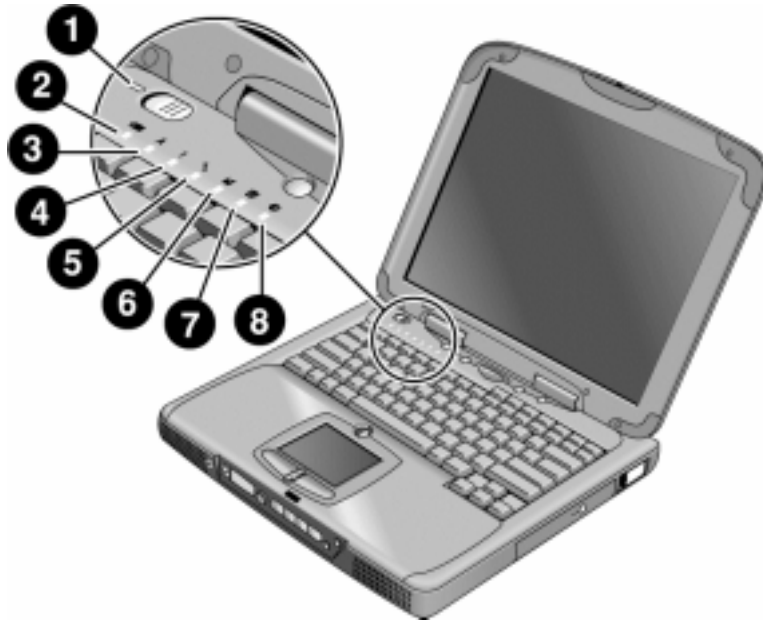







Figure 1-5. Status Lights

- | | |
|--------------------|----------------------------------|
| 1. Power status. | 5. Scroll lock. |
| 2. Battery status. | 6. Floppy disk drive activity. |
| 3. Caps lock. | 7. Hard disk drive activity. |
| 4. Num lock. | 8. CD-ROM or DVD drive activity. |

Table 1-1. Status Lights

Indicator	Meaning
LED next to power button	Power status Green: notebook is on. Amber: notebook is in Standby mode. No light: notebook is off or in Hibernate mode.
	Battery status Green: The AC adapter is connected and the battery is fully charged. Amber: The AC adapter is connected and the battery is charging. Red: The AC adapter is connected and the battery has a fault. Off: The AC adapter is not connected, or the adapter is connected but the battery is missing.
A	Caps Lock Caps Lock is active.
1	Num Lock Num Lock is active. (The Keypad Lock must also be on to use the embedded keypad.)
	Scroll Lock Scroll Lock is active.
	Floppy disk drive activity Green: notebook is accessing the floppy disk drive.
	Hard disk drive activity Green: notebook is accessing the hard disk drive.
	CD-ROM or DVD drive activity Green: notebook is accessing the CD-ROM or DVD drive.

In addition, the status panel on the front of the notebook provides CD playback status and other system information. For details, see the section “Status panel” in the notebook’s *Reference Guide*.

Using Fn Hot Keys

The combination of the Fn key plus another key creates a *hot key*—a shortcut key sequence—for various system controls. To use a hot key, press *and hold* Fn, press the appropriate second key, then release both keys.

External keyboards support only Fn+F5, Fn+F7, and Fn+F12. To use these, press and hold left CTRL+left ALT, press the appropriate second key, then release both keys.

Table 1-1. Fn Hot Keys

Hot Key	Effect
Fn+F1	Decreases the display brightness.
Fn+F2	Increases the display brightness.
Fn+F5	Toggles among the built-in display, an external display, and simultaneous display on both.
Fn+F7	Mutes the notebook's speakers.
Fn+F8	Toggles the built-in numeric keypad on and off. Does not affect an external keyboard. If Num Lock is on, the numeric functions are active; otherwise, cursor control is active.
Fn+F12	Enters Hibernation mode (Windows 2000 only).
Fn+NumLock	Toggles Scroll Lock on and off (except on external keyboards).
Fn+Up arrow	Increases sound volume (except on external keyboards).
Fn+Down arrow	Decreases sound volume (except on external keyboards).

Resetting the Notebook

Occasionally, Windows or the notebook may stop responding, so that you cannot turn the notebook off. If this happens, try the following in the order listed:

- If possible, shut down Windows: press CTRL+ALT+DEL, then click Shut Down. Press the blue standby button to restart.
- Slide and hold the power button for about four seconds, until the display shuts down, then press the blue standby button to restart.
- Insert a straightened paper clip into the system-off switch on the left side of the notebook (beneath the PC card eject buttons), then press the blue standby button to restart.

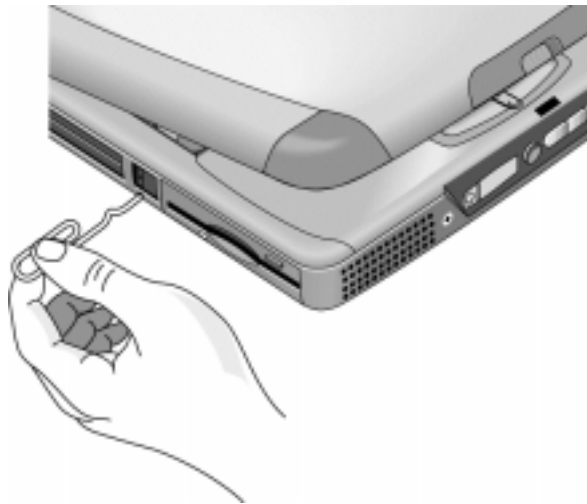


Figure 1-6. Resetting the Notebook

Note

To boot from a CD-ROM or DVD drive in the module bay, insert a bootable CD (such as the *Recovery CD*.) into the drive, then restart. Press ESC twice when the HP logo and prompt appear, then select the CD-ROM/DVD drive as the temporary boot device.

Using the CD-ROM or DVD Player

The multimedia buttons on the front of the notebook control the CD-ROM/DVD player, and work in much the same way as do the controls of a standalone CD-ROM or DVD player. The CD-ROM/DVD player operates whether the notebook is on, off, or in standby or hibernate mode. (When the notebook is on, the volume control buttons also govern the volume for most other audio applications.)

If the notebook is off or in standby or hibernate mode, slide the multimedia power switch to the left to activate the player. For details about using the CD-ROM/DVD player, see the notebook's *Reference Guide*.

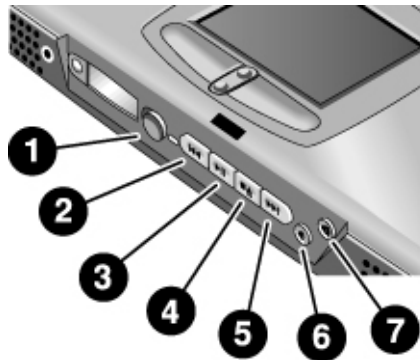


Figure 1-7. Multimedia Buttons

- | | |
|---|--------------------------------|
| 1. Multimedia power (use only when notebook is turned off or in standby or hibernate mode). | 5. Next track button. |
| 2. Previous track button. | 6. Volume control down button. |
| 3. Play/pause button. | 7. Volume control up button. |
| 4. Stop button (when notebook is on).
Stop/eject (when notebook is off). | |

Specifications

The following tables list the specifications for the notebook and its accessories. These are subject to change: for the latest versions, see the HP Notebook web site, www.hp.com/notebooks (in Europe: www.europe.hp.com/notebooks).

Hardware Specifications

Table 1-1. XE3 Series Hardware Specifications

Dimensions	14.1/12.1-in display: 331 x 272.3 x 40.5 mm (13.03 x 10.72 x 1.59 in). 15/13-in display: 331 x 272.3 x 42.0 mm (13.03 x 10.72 x 1.65 in).
Weight	3.0–3.4 kg (6.7–7.4 lb), depending on configuration.
Processor	Intel Pentium III 500/550/600/650/700/750/800 MHz by μ PGA2 with SpeedStep. Intel Celeron 500/550/600/650/700 MHz by μ PGA2. 100-MHz FSB.
Display	800 x 600 SVGA TFT 12.1-in LCD. 1024 x 768 XGA TFT 13-in LCD. 1024 x 768 XGA TFT 14.1-in LCD. 1024 x 768 XGA TFT 15-in LCD.
Graphics Controller	S3 Savage/IX: <ul style="list-style-type: none">– Integrated 4 MB SGRAM.– Supports AGP 2x mode.– 128-bit, single-cycle 3D architecture.– Simultaneous LCD/CRT and LCD/CRT/TV capability.– Optimized hardware motion compensation.– New high-performance, 128-bit 2D engine.– Integrated single-channel 110-MHz LVDS interface.– Integrated NTSC/PAL encoder.
Chip Set	Intel 440ZXM-100.
SDRAM	100 MHz SDRAM (PC100). No SDRAM on board. Two 1.25-in. slots for expansion up to 256 MB, using two 128-MB SODIMM modules (144 pin, 3.3 V).
Power	Battery: rechargeable 9-cell: <ul style="list-style-type: none">– Lithium ion: 11.1 V, 5400 mAh, 18650 size.– Nickel metal hydride: 10.8 V, 4000 mAh, 17670 size.– Operating time: up to 3.3 hours typical (varies with configuration and usage).– Recharge time: 2.2 hours.– Standby/resume capability.– Smart pack, SM bus. AC adapter: Universal 60-watt, 100-240 Vac (50/60 Hz) input, 19 Vdc output.
Mass Storage	Hard disk drive: <ul style="list-style-type: none">– 5 or 10 GB, PCI Bus Master Enhanced IDE.– 9.5 mm, 2.5-in.– Supports Ultra DMA/33. Floppy disk drive: 1.44-MB, 12.7 mm, 3-mode module. CD-ROM/DVD drive: 24x CD-ROM or 4x CD-RW, 12.7 mm module.

Keyboard and Pointing Device	<p>Keyboard:</p> <ul style="list-style-type: none"> – 87-/88-/90-key touch-type QWERTY keyboard with 101/102 key emulation. – Embedded numeric keypad, 12 function (Fn) keys. – Spill-resistant. – NS 87570 keyboard controller. <p>Pointing device: touch pad with on/off and scroll up/down buttons.</p>
Audio System	<p>ESS Allegro (1988):</p> <ul style="list-style-type: none"> – Integrated AC'97 CODEC. – HSP modem interface via MC'97 link. – Support wake-up on ring. <p>Modem CODEC ESS 2828 on mini-PCI slot.</p> <p>Stereo sound via two built-in speakers.</p> <p>Built-in microphone.</p> <p>Microphone and headphone jacks.</p>
CD Player	OZ-163 controller. CD can play while notebook is off.
Communications	<p>LAN:</p> <ul style="list-style-type: none"> – Transmission rate: 10 or 100 Mbps based on Auto-Negotiation. – Data standard: supports Category 3 (10BaseT/100BaseT) and Category 5 (100 Base TX) media coupler. – 10BASE-T/100BASE-TX: 10BASE-T/100BASE-TX MAC+PHY integrated controller solution. – Power management: supports remote power-up using Wake on LAN (WOL) technology and Deep power-down mode support. <p>Modem:</p> <ul style="list-style-type: none"> – Data modem standard: supports V.90, V.34, V.32bis, V.32, V.22bis, V.22, V.23, and V.21; Bell 212A and 103. – Error correction: V.42 LAPM, and MNP 2-4 error correction. – Data compression: V.42bis and MNP 5 data compression. – Fax modem standard: send/receive rates up to 14400 bps, V.17, V.29, V.27ter, and V.21 channel 2. – Power management: supports ACPI Power Management and wake up on ring.
Input/Output	<p>Super I/O controller: SMC 869.</p> <p>Serial port: 9-pin (RS232), 115,200-bps (16550 UART).</p> <p>Parallel port: 25-pin, bi-directional, high-speed, with ECP/EPP capability.</p> <p>PS/2 port: 6-pin keyboard/keypad/mouse port (Y adapter compatible).</p> <p>VGA video out: 15-pin, with hot plug/unplug CRT-detect. (Resolution from 640 × 480 up to 1024 × 768, depending on available SDRAM.)</p> <p>Two universal serial bus (USB) ports.</p> <p>One IrDA-compliant fast infrared (FIR) port.</p> <p>Docking port for simple port replicator.</p> <p>DC-in jack.</p> <p>Composite TV out: supports LCD, CRT, LCD/CRT, LCD/TV.</p>
PCMCIA	<p>TI 1420: two slots</p> <ul style="list-style-type: none"> – PC Card 95 supports one type III or two type II sockets. – Complies with PCI power management, ACPT 2.0, PCI local bus spec. Rev. 2.2. – 3.3-volt core logic with universal PCI interface, compatible with 3.3/5-volt PCA signaling environment. – Supports burst transfers to maximize data throughput on both PCI buses. – Supports parallel PCI interrupts, parallel ISA IRQ with parallel PCI interrupts, serial ISA IRQ with parallel PCI interrupts, and serial ISA IRQ with PCI interrupts. – Can wake up from D3 (cold). – No Zoomed Video support.
Options	<p>32/64/128 MB PC-100 SODIMM: 3.3V, 144-pin, SDRAM.</p> <p>Simple port replicator.</p> <p>Mini-PCI modem, supporting wake-up on Ring# from D3 (cold) with AC-in.</p> <p>Mini-PCI modem/LAN combo, supporting wake-up on Ring# & PME# from D3 (cold) with AC-in.</p>

Mechanical Features	Kensington MicroSaver lock slot. Continuously variable-speed fan.
Standards	PC99, ACPI.
Environmental Limits	Operating temperature: 0 to 40 °C (32 to 104 °F). Operating humidity: 10 to 90 percent RH without condensation. Operating altitude: up to 3050 m (10,000 ft). Storage temperature: –20 to 65 °C (–4 to 149 °F). Storage altitude: up to 12,200 m (40,000 ft). Mean time between failure: 20,000 hours.

Software Specifications

Table 1-1. XE3 Series Software Specifications

Operating Software	Microsoft Windows 98SE, 2000, or Millennium Edition (all in ACPI mode). 512KB flash BIOS ROM (PLCC type with socket for B-Test only). Supports standby to RAM or hard disk. Hot keys for system control. Password protection. Auto-configuration when using simple port replicator. PC99 ready with Plug-and-Play. Keyboard BIOS flashable. ACPI 1.0b compatible. Smart battery support. DMI EEPROM (2 KB) extension. Bootable devices; FDD, HDD, CD-ROM/DVD.
Applications	Adobe Acrobat Reader. MusicMatch MP3 software (certain models only). DVD player (models with DVD only). One-Touch Button software. Fax software (included in Windows 2000). Virus protection software. For additional information about the notebook's software, see the HP Notes.

System Resources

The following tables list the default values for the notebook's system resources. Use the BIOS Setup utility (see page 3-29) to view all available port and audio device configurations in the System Devices menu.

The tables in this section show typical resource usage as set up by the notebook's BIOS. Plug-and-play operating systems, drivers, and BIOS Setup settings may change some of the entries.

Table 1-1. System Interrupts

0	System timer
1	Keyboard
2	Cascade from secondary interrupt controller
3	Free
4	COM1 (serial port)
5	Audio
6	Floppy disk drive
7	LPT1 (ECP parallel port)
8	Real-time clock
9	SCI
10	PCI IRQ (shared by all PCI devices)
11	Free (or MIDI if enabled)
12	Touch pad, PS/2 mouse
13	Numeric coprocessor
14	Internal hard disk drive (primary IDE controller)
15	Internal CD-ROM drive (secondary IDE controller)

Table 1-2. System Memory

00000–9FFFF	System memory
A0000–BFFFF	Video
C0000–CFFFF	Video BIOS
D0000–DBFFF	Free: can be used for upper memory blocks (UMBs) or PC card memory windows
DC000–FFFF	System BIOS

Table 1-3. System Input/Output Addresses (100-3FF)

170–177	Internal CD-ROM drive (secondary IDE controller)
1F0–1F7	Internal hard disk drive (primary IDE controller)
220–22F	DOS games (FM decoding)
376	Internal CD-ROM drive (secondary IDE controller)
378–37F	LPT1 (printer port)
388–38B	DOS games (FM decoding)
3B0–3BB	VGA adapter
3C0–3DF	VGA adapter
3E0–3E1	PCMCIA controller
3F0–3F5	Floppy disk drive controller
3F6	Internal hard disk drive (primary IDE controller)
3F7	Floppy disk drive controller
3F8–3FF	COM1 (serial port)

Table 1-4. DMA Channels

0	Free
1	Free
2	Floppy disk drive
3	LPT1 (ECP parallel port)
4	Cascade from secondary DMA controller
5	Free
6	Free
7	Free

Table 1-5. XE3 Series Accessories

Accessory	Description
Memory	
F1456B	32-MB SDRAM PC-100 expansion module
F1457B	64-MB SDRAM PC-100 expansion module
F1622B	128-MB SDRAM PC-100 expansion module
Power Options	
F1454A	AC adapter (60-watt)
F1781A	Ultra Slimline AC adapter (60-watt)
F1455A	Auto/airline AC adapter (75-watt)
F2024A	Lilon battery (9 cell)
Adapters	
F1469A	PS/2 "Y" adapter
PC Cards	
F1623A	10/100-Mbps Ethernet +56-Kbps modem PC Card by Xircom
F1625A	56-Kbps global modem PC Card by Xircom
F1626A	10/100 LAN CardBus PC Card by 3Com
F1626B	10/100 LAN CardBus PC Card by 3Com
F1627A	56-Kbps US modem PC Card by Xircom
F1643A	RealPort 10/100-Mbps Ethernet + 56-Kbps modem PC Card by Xircom
F1985A	USB-NIC Ethernet adapter by 3Com
Docks	
F2025A	Simple port replicator
Wireless Accessories	
F2135A	Wireless LAN access point
F2136A	Wireless LAN PC Card
F2137A	Wireless LAN PCI adapter
F2138A	Wireless card
Security Accessories	
F1645A	Kensington MicroSaver Notebook Security System
F1747A	Port Defcon 1 Notebook Security System
F1611C	Mobile ProtectTools 2000 Smart Card Kit (128-bit version for U.S. and Canada only)
F1612C	Mobile ProtectTools 2000 Smart Card Kit (40-bit version for outside U.S. and Canada)

Internal Design

The motherboard PCA is the central component of the notebook's design, and plays a role in virtually all system functions. The CPU module and most other subsystems connect to the motherboard.

The following figure shows the connections among the notebook's replaceable electronic modules. In addition, the table on page 1-18 lists the roles that the replaceable modules play in each of the notebook's functional subsystems.

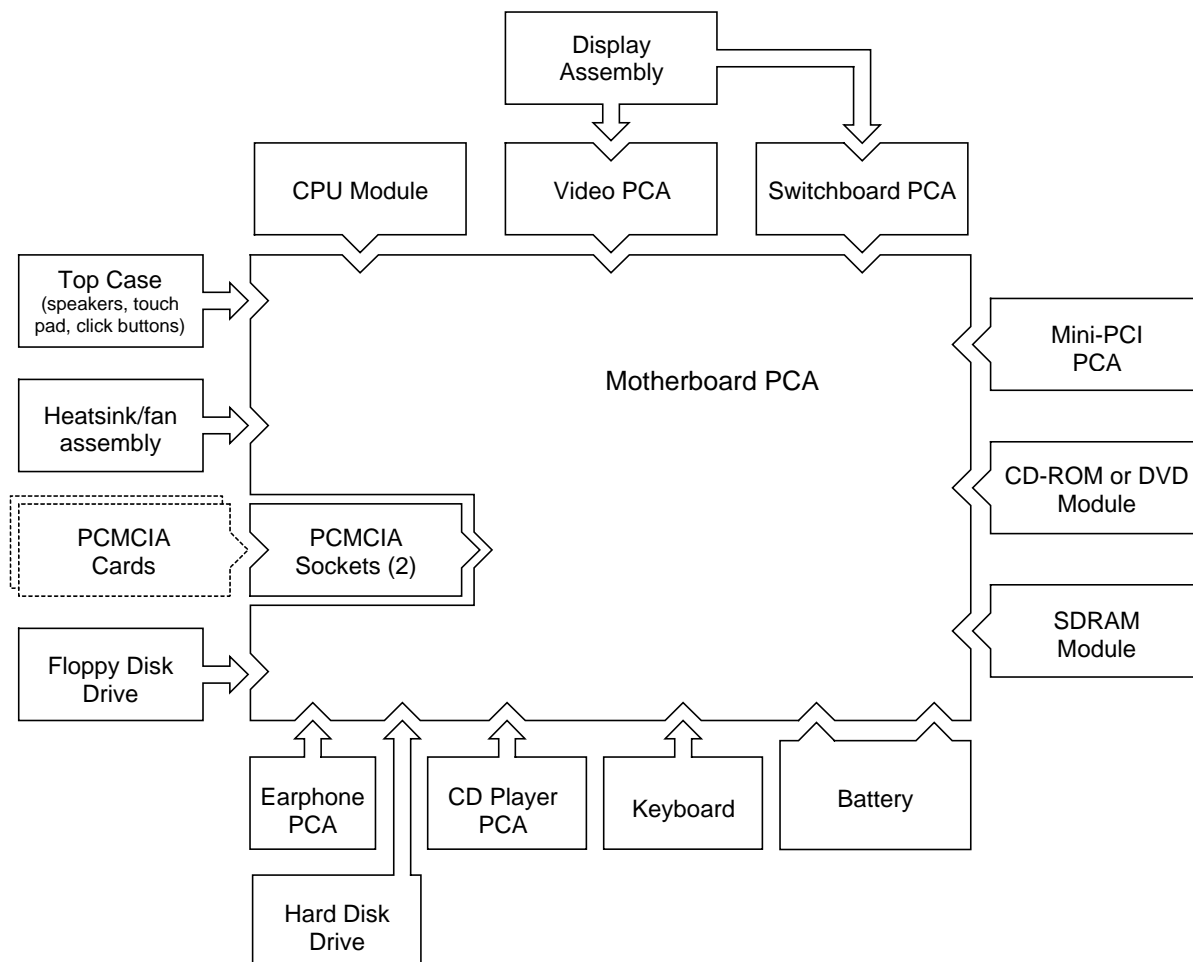


Figure 1-8. Replaceable Module Diagram

Table 1-1. Functional Structure

Function	Components Used	Component Roles
Bootup	CPU module Motherboard Floppy disk module Hard disk drive	Main processor. Primary system circuitry. First source of disk-based startup code. Second source of disk-based startup code.
Processor	CPU module Motherboard	Main processor, numeric data processor, L1 and L2 cache. Primary system circuitry.
Memory	Motherboard SDRAM module Video PCA	No onboard RAM. Changeable RAM (2 slots). Video RAM.
Power	Battery Motherboard Switchboard PCA AC adapter	Power storage. Power control circuitry, AC adapter socket, lid switch, system-off switch, power supply. Power button, standby button. AC-to-DC converter.
Display	Motherboard Display assembly Video PCA	Video controller. Display output, backlight, power converter for backlight. Display drivers, LVDS processing, display/graphics controller, video RAM.
Hard disk	Motherboard Hard disk drive	Hard disk controller. Hard disk mechanism.
Floppy drive	Motherboard Floppy disk module	I/O controller, floppy connector. Floppy disk mechanism.
Keyboard	Motherboard Keyboard	Keyboard controller, keyboard BIOS. Key switches.
Touch pad	Motherboard Top case	Keyboard BIOS. Touch pad sensor, click buttons, controller (PS/2 output).
Audio	Motherboard Switchboard PCA Headphone PCA Top case	Audio controller, audio decoder, speaker amplifier, external microphone jack. Microphone. Earphone amplifier. Speakers.
Status	Motherboard Switchboard PCA CD player PCA	LED circuitry, keyboard controller. Status LEDs. CD-ROM/DVD status display.
Serial	Motherboard	I/O controller, serial connector.
Parallel	Motherboard	I/O controller, parallel connector.
Infrared	Motherboard	I/O controller, infrared transmitter/receiver.
PS/2 port	Motherboard	Keyboard controller, PS/2 connector.
USB	Motherboard	Bus controller, USB connectors.
Docking port	Motherboard	Docking logic, docking connector.
PCMCIA	Motherboard PCMCIA sockets	PCMCIA controller. PCMCIA connectors.

Removal and Replacement

This chapter tells you how to remove and replace the notebook's removable components and assemblies. The items marked by • in the following table are user-replaceable.

Table 2-1. Removal Cross-Reference

<ul style="list-style-type: none"> • Battery (page 2-3). • Carrier, hard disk drive (page 2-14). Case, bottom (page 2-34). Case, top (page 2-20). • Cover, keyboard (page 2-9). • Cover, mini-PCI (page 2-16). • Cover, SDRAM (page 2-16). • Covers, screw (page 2-16). Display assembly (page 2-17). Doors, docking (page 2-38). Doors, PCMCIA (page 2-39). Drive, CD-ROM/DVD (page 2-33). Drive, floppy disk (page 2-31). • Drive, hard disk assembly (page 2-13). 	<ul style="list-style-type: none"> Heatsink assembly (with fan) (page 2-27). • Keyboard (page 2-11). Module, CPU (page 2-29). • Module, SDRAM (page 2-5). PCA, CD player (page 2-22). PCA, headphone (page 2-41). • PCA, mini-PCI (page 2-7). PCA, motherboard (page 2-34). PCA, switchboard (page 2-41). PCA, video (page 2-25). Plate, CPU support (page 2-42). Saddle, hinge set (page 2-22). Socket, PCMCIA (page 2-42).
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Caution

Always provide proper grounding when performing repairs. Without proper grounding, an electrostatic discharge can damage the notebook and its components.



Notes

To reassemble a component, perform the removal procedure in reverse order. Any special notes required for reassembly are included at the end of each section.

 Symbols like this throughout this chapter show approximate full-size screw outlines. You can use these to verify the sizes of screws before you install them. Installing a wrong-size screw can damage the notebook. (The symbol at the left represents an M2.5×5mm T-head screw.)

Disassembly Flowchart

The following diagram shows the general “path” you will use in disassembling the notebook to access any particular component.

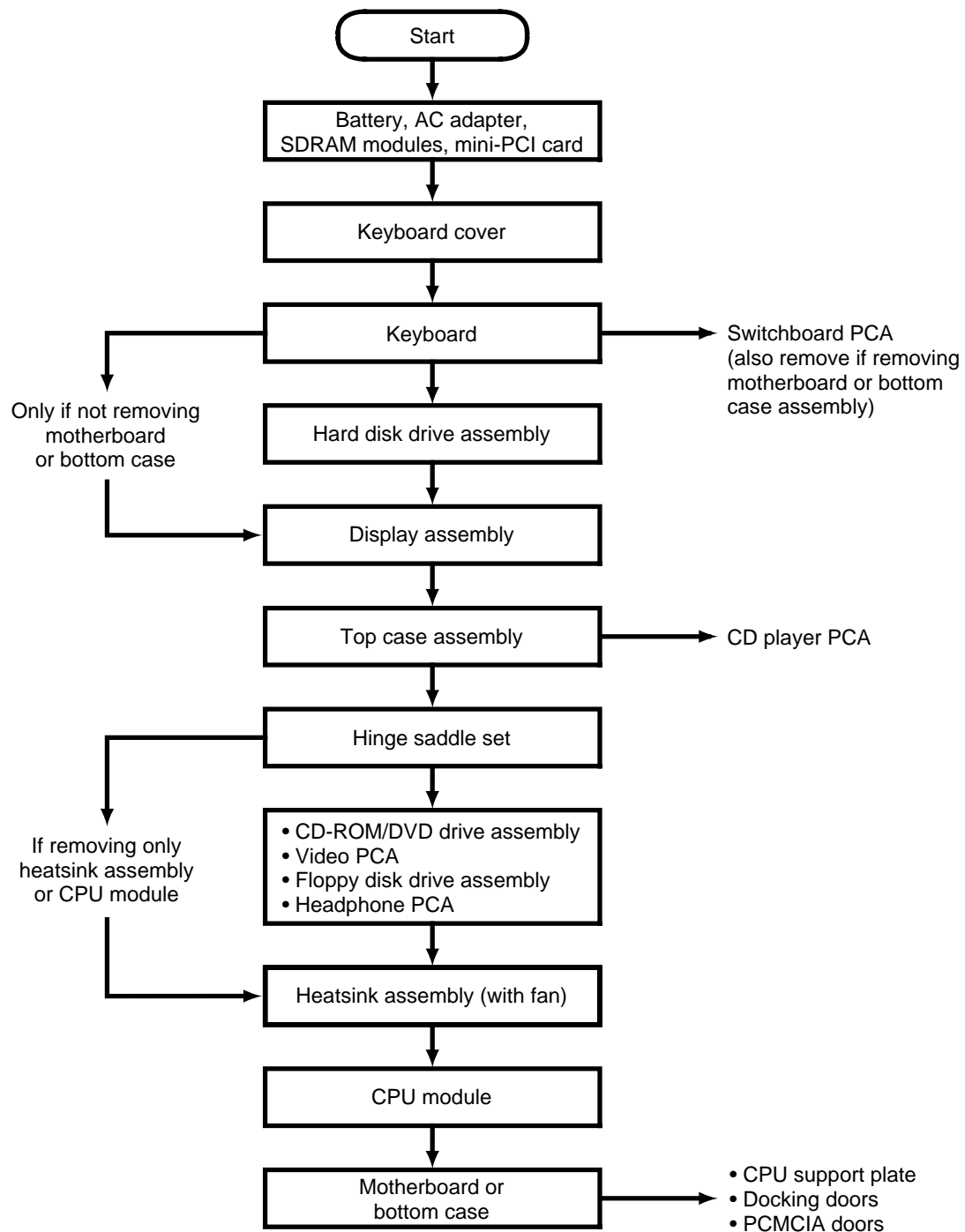


Figure 2-1. Disassembly Flow

Table 2-1. Required Equipment

- Small Phillips screwdriver, preferably magnetized.
- Small flat-blade screwdriver.
- 5mm hexagonal socket screwdriver.

Table 2-2. Recommended Screw Torques

Screw Thread Size	Torque (cm-kgf)	Torque (in-lbf)
M2.5 (2–11 mm long)	3.0 – 3.5	2.6 – 3.0
M2.5 (12–19 mm long)	2.5 – 3.0	2.2 – 2.6
M3	3.0 – 3.5	2.6 – 3.0

NOTES

Removing the Battery

(User-Replaceable)

Required Equipment

- None.

Removal Procedure

- Slide the battery's release latch, then lift the battery out of its compartment.

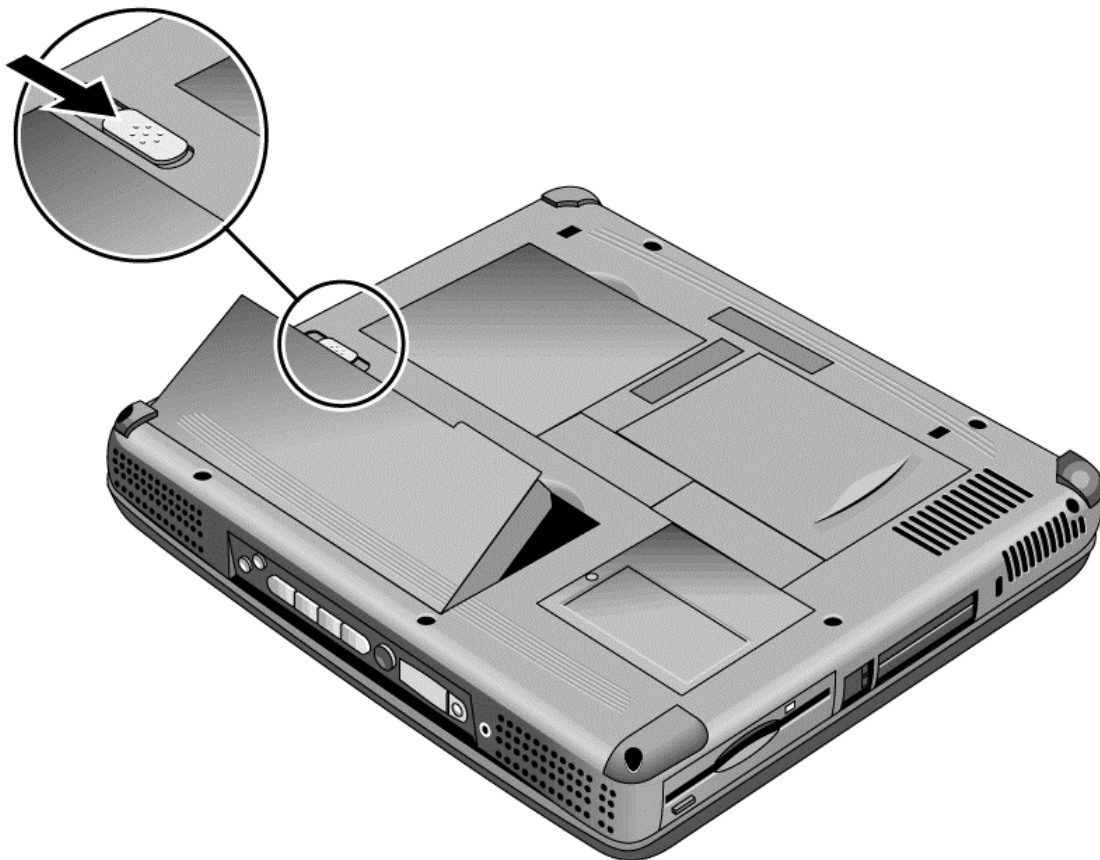


Figure 2-2. Removing the Battery

Reassembly Notes

- Insert the front (rounded) end of the battery into the battery compartment, and lower the back end in until it clicks into place.

Removing an SDRAM Module (User-Replaceable)

The notebook has no SDRAM on its motherboard, but has slots for two SDRAM modules. One slot contains an SDRAM module installed at the factory.

See Table 4-2 on page 4-5 for a listing of replacement SDRAM modules and part numbers.

Caution

Provide proper grounding and handle the SDRAM module only by its edges, or you could damage the module through electrostatic discharge.

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. On the bottom of the notebook, loosen both screws holding the SDRAM cover (the cover retains the screws), and remove the cover.

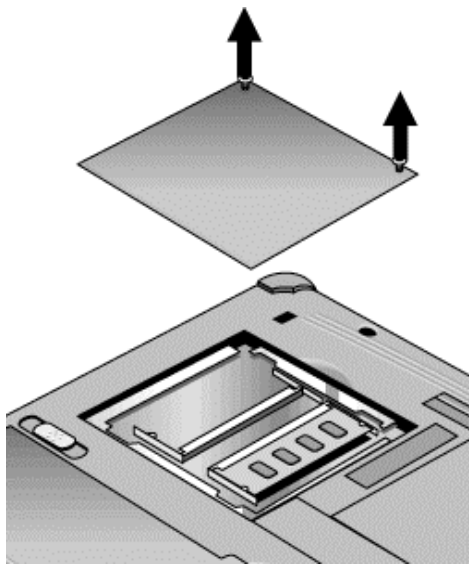


Figure 2-3. Removing the SDRAM Cover

3. Press outward to release the latches at the sides of the SDRAM module, so the free edge of the module pops up.

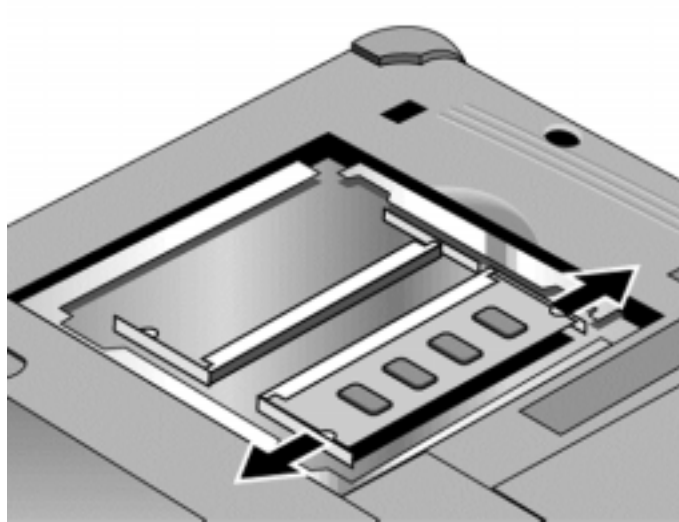


Figure 2-4. Removing an SDRAM Module

4. Pull the module out of the connector.

Reassembly Notes

- Gently press the SDRAM module into the connector at an angle of about 30°, until it is fully inserted. Then press down on both sides of the module until the latches snap closed.

Removing the Mini-PCI PCA (User-Replaceable)

Certain notebook models include a mini-PCI PCA that contains either a modem or modem/LAN. See Table 4-2 on page 4-5 for a listing of replacement PCAs and part numbers.

Caution

Provide proper grounding and handle the PCA only by its edges, or you could damage it through electrostatic discharge.

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Loosen the screw holding the mini-PCI cover (the cover retains the screw), and remove the cover.
3. Press outward to release the latches at the sides of the PCA, so that its free edge pops up.
4. Disconnect the cable (modem models only) or cables (modem/LAN models only) from the PCA.
5. Gently pull the PCA out of its connector.

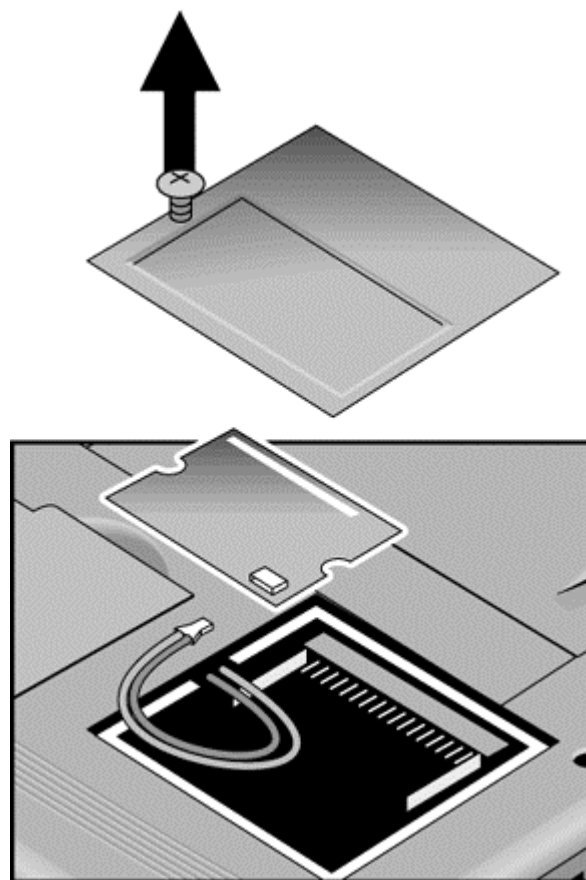


Figure 2-5. Removing the Mini-PCI Card

Reassembly Notes

- Reattach the cable (modem models only) or cables (modem/LAN models only) to the PCA, and tuck them into the compartment.
- Gently press the mini-PCI card into the connector at an angle of about 30°, until it is fully inserted. Then press down on both sides of the card until the latches snap closed.

Removing the Keyboard Cover (with Hinge Covers) (User-Replaceable)

Required Equipment

- Small Phillips screwdriver.
- Small flat-blade screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Close the display, and remove both screws from the backs of the hinge covers.

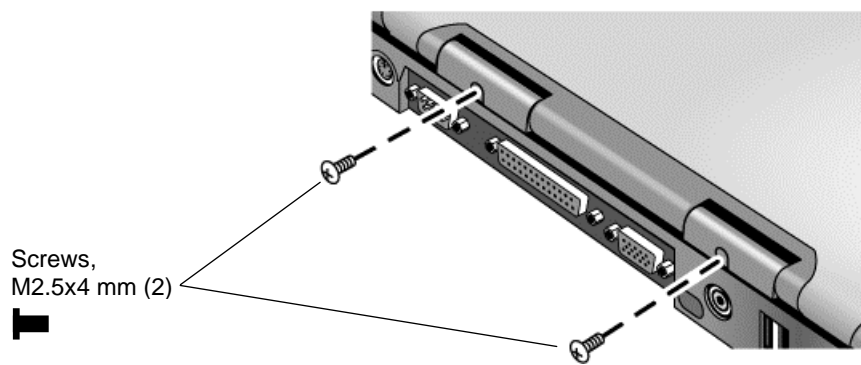


Figure 2-6. Removing the Keyboard Cover Retaining Screws

3. Open the notebook's display 180°, so that it lays flat.
4. Use the flat-blade screwdriver to carefully pry up the inside edges of the hinge covers until the cover pops loose, then lift the cover off.



Figure 2-7. Removing the Keyboard Cover

Reassembly Notes

- Tuck the display cables into the notch just to the right of the left display hinge.
- Hold the cover by the hinges and snap it into place. Note that the cover is held in place partly by tabs at the left and center of its bottom edge, and at its upper left and right corners. Make sure these tabs snap back into place when reinstalling the cover.

Removing the Keyboard

(User-Replaceable)

Required Equipment

- Small Phillips screwdriver.
- Small flat-head screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove the keyboard cover (page 2-9).
3. Loosen the four retaining screws along the top of the keyboard (the keyboard retains the screws).

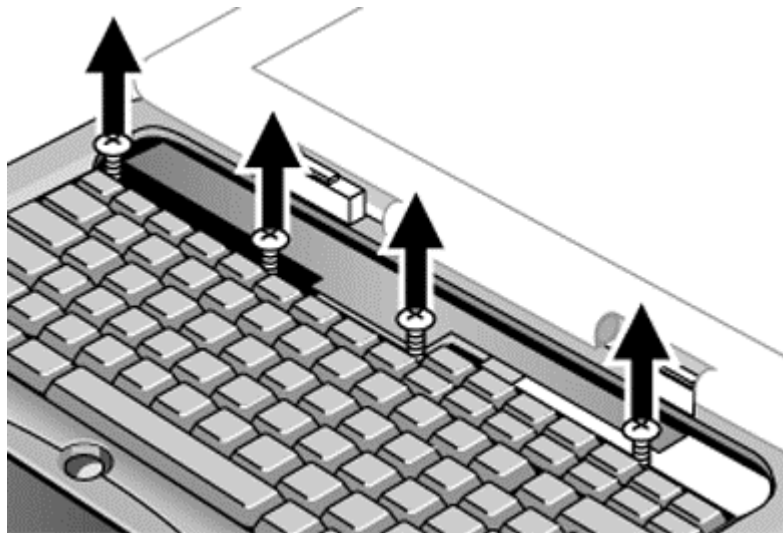


Figure 2-8. Loosening the Keyboard Retaining Screws

4. Raise the top of the keyboard, then lift the keyboard up and out of the notebook. Be careful not to pull on the ribbon cable connecting the keyboard to the notebook.

Caution

Be careful not to touch the heatsink until it has cooled. It could be hot if the notebook was running recently.

5. Lay the keyboard face down on the top case, forward of its normal position, and disconnect the ribbon cable from the motherboard.

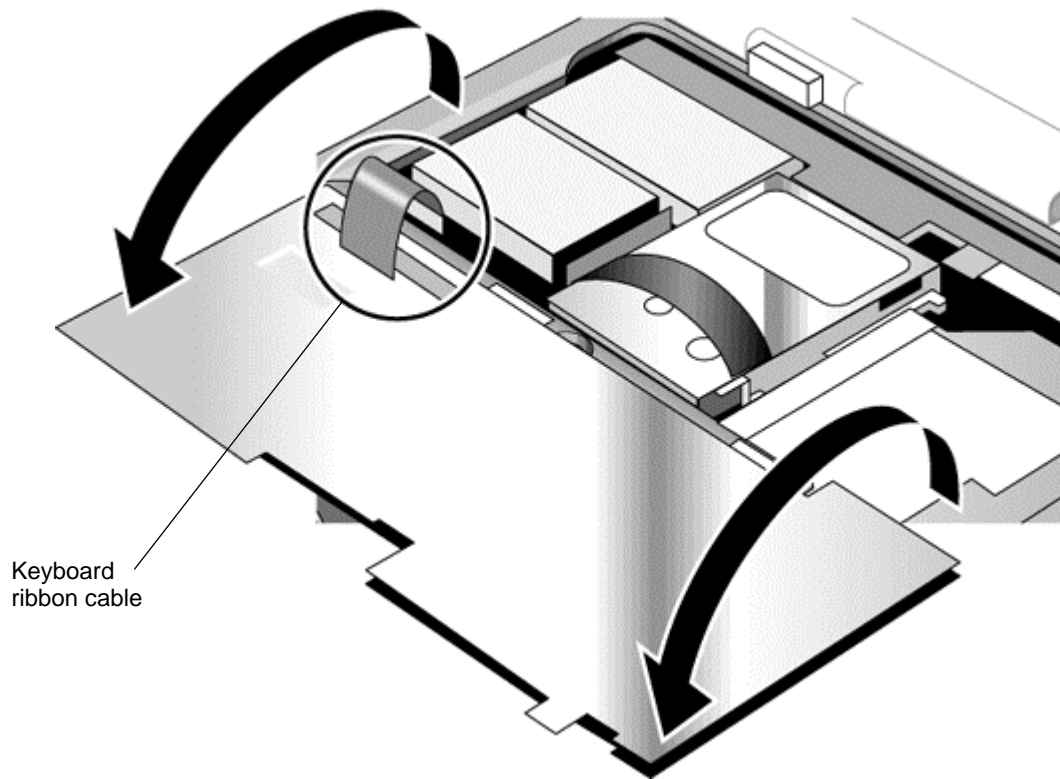


Figure 2-9. Disconnecting the Keyboard Cable

Reassembly Notes

- Lay the keyboard face down on the top case forward of its normal position, then reconnect the ribbon cable.
- Slip the metal tabs on the bottom of the keyboard into their slots in the top case, then lower the keyboard into place.

Removing the Hard Disk Drive Assembly (User-Replaceable)

See Table 4-2 on page 4-5 for a listing of replacement hard disk drives and part numbers.

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).

Caution

Be careful not to touch the heatsink until it has cooled. It could be hot if the notebook was running recently.

3. Loosen the four screws attaching the hard drive carrier to the motherboard (the carrier retains the screws).
4. Use the strap on the hard drive to carefully pull the drive off of its connector and out of the notebook.

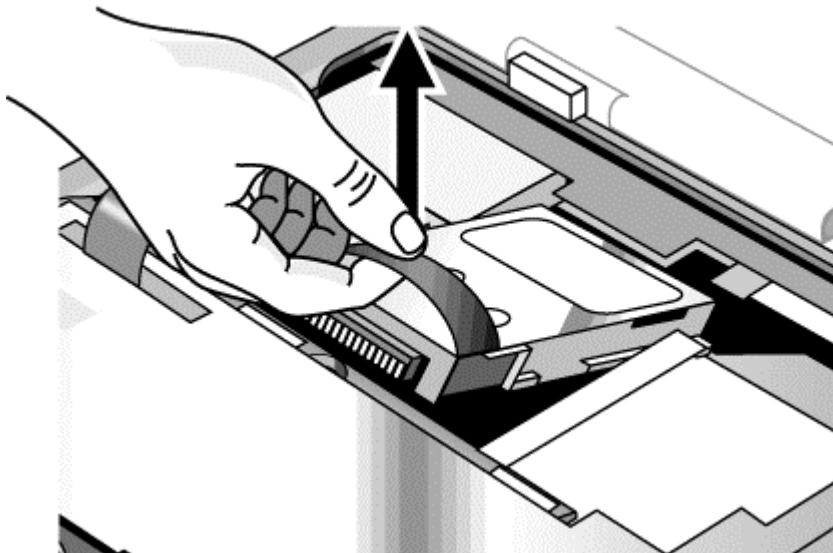


Figure 2-10. Removing the Hard Disk Drive

5. Remove all four screws from the underside of the hard drive carrier, then slide the drive back and up out of the case.

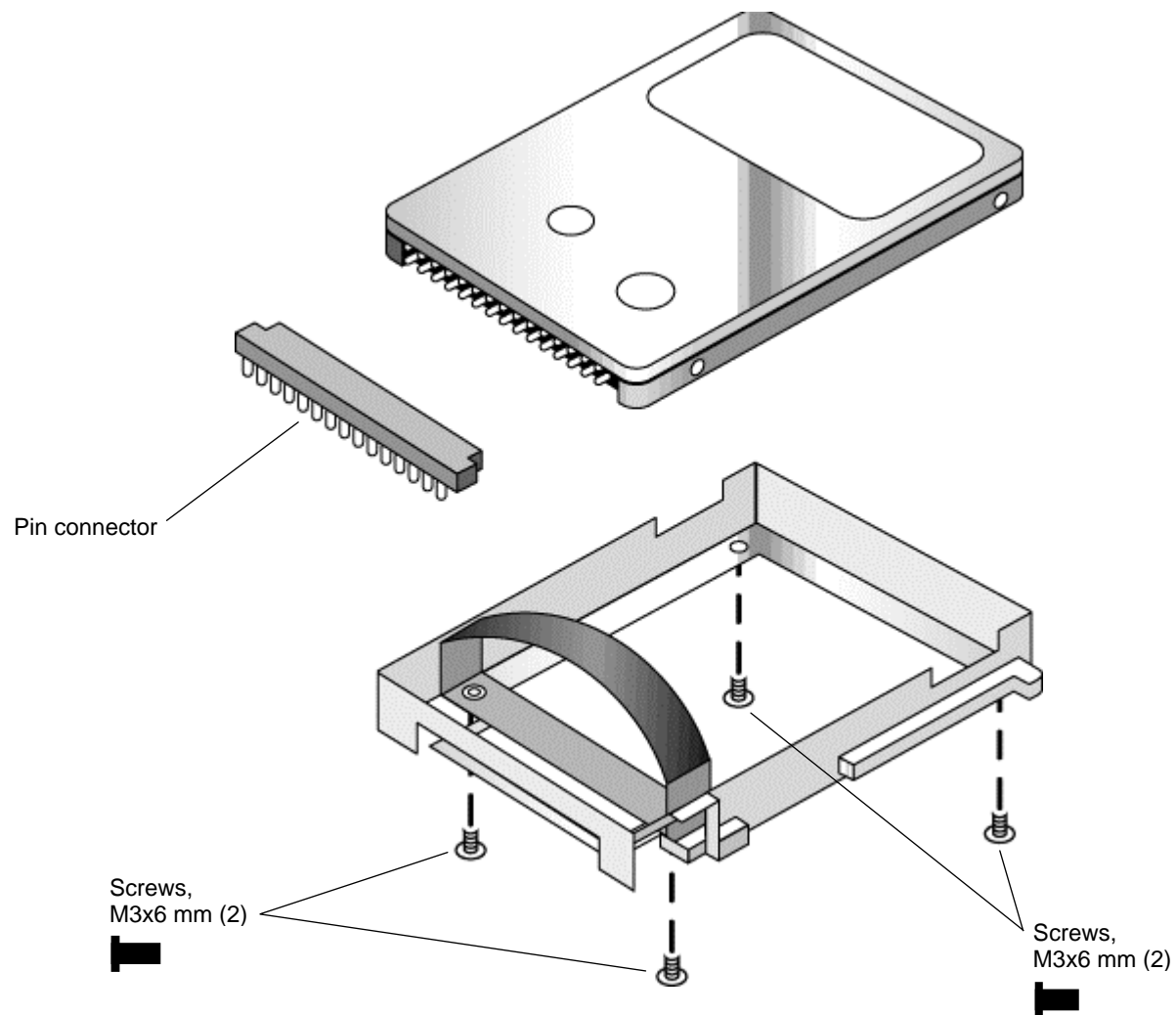


Figure 2-11. Removing the Hard Disk Carrier

6. Carefully remove the pin connector from the end of the drive by working alternately at each side, so that the connector slides off evenly without bending the connector pins.

Reassembly Notes

- Carefully put the pin connector back onto the pins on the end of the new hard drive. Work at each end alternately so that the connector slides on evenly without bending the connector pins.
- Be careful not to trap the heatsink and keyboard cables beneath the hard drive.

Recovering and Reinstalling Software

You can use the *Recovery CD* to recover an original build or reinstall the HP custom software. To recover a specific application, see “To recover an application” in the *Reference Guide*.

The *Recovery CD* provides all HP notebook–specific Windows drivers; these drivers are in the following directories:

- On the hard drive, under c:\hp\drivers.
- On the *Recovery CD*, under \hp\drivers.
- On the HP notebook web site at <http://www.hp.com/notebooks>. This web site contains the latest software drivers.

To recover the factory software installation

The following procedure describes how to recover the notebook’s original Windows software and operating system.

This process can take about 10 or 15 minutes. Do not interrupt the process or unplug the AC adapter before the process is complete, or you will have to begin again.

Caution

This procedure formats the hard disk drive, which erases all data on the drive. After formatting, you must reinstall any applications.

1. Back up all data from the hard disk.
2. Connect the AC adapter to the notebook.
3. Insert the *Recovery CD* in the notebook’s CD-ROM drive.
4. Restart the notebook. When the HP logo appears, press F2.
5. Select the CD-ROM drive as the first boot device, then restart the notebook again.

You can find more details about recovering the factory installation of Windows on the Recovery CD: the file readme.txt is in the CD’s root directory.

Note

Windows 98 supports the FAT16 and FAT32 file systems. Windows 2000 supports the FAT16, FAT32, and NTFS file systems.

Replacing Small Parts

(User-Replaceable)

The user can replace the following small parts.

Table 2-1. Replacing Small Parts (User-Replaceable)

Part	Replacement Procedure
Cover, mini-PCI	On the bottom of the notebook, loosen the screw in the mini-PCI cover (the cover retains the screw) and remove the cover.
Cover, SDRAM	On the bottom of the notebook, loosen the screws in the SDRAM module cover (the cover retains the screws) and remove the cover.
Covers, screw (on display bezel)	Insert a small flat-blade screwdriver under the cover and pry it loose. To replace, firmly press the adhesive side of the cover into the recess.

Removing the Display Assembly

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
3. Remove both screws from the switchboard PCA, and carefully lift the PCA off the connector underneath it. Be carefully not to pull on the cable attached to the PCA.
4. Disconnect the cable from the switchboard PCA, and remove the PCA from the notebook.
5. Disconnect the cable from the video PCA.
6. Remove the four flanged screws from the display hinges. This may be easier if you support the display so that it remains approximately flat.
7. Lift the display off of the notebook.

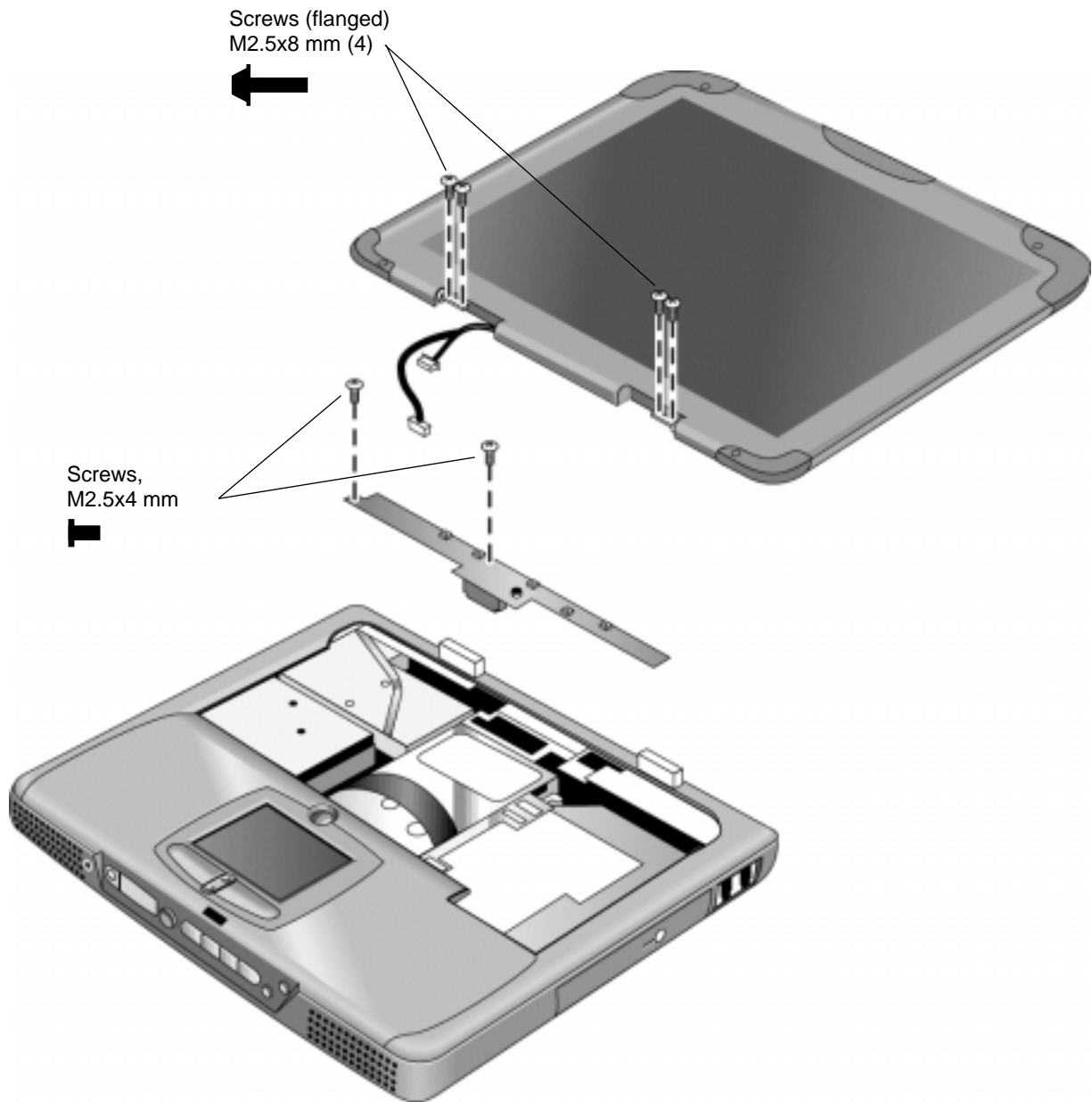


Figure 2-12. Removing the Display

Reassembly Notes

- While installing the hinge screws, support the display so that it remains approximately flat.
- Before installing the switchboard PCA, make sure the large display cable lies within the notch in the hinge saddle.
- When installing a new display assembly, follow the procedure given in “Installing a New Display Assembly” on the following page.

Installing a New Display Assembly

When installing a new display, you must make sure to set the DIP switches on the video PCA to match the particular display assembly. Do this as follows.

Caution

Setting the DIP switches improperly could damage the display assembly.

1. Find the manufacturer of the display: this is shown on a label attached to the display assembly.
2. Find the display's manufacturer and model in the table below, and set the DIP switches on the video PCA as shown.

Model	1	2	3	4
CPT 14.1-in TFT XGA	ON	OFF	ON	OFF
Hitachi 15.0-in TFT XGA	OFF	ON	OFF	OFF
LG 13.3-in TFT XGA	ON	OFF	OFF	ON
LG 14.1-in TFT XGA	OFF	ON	OFF	ON
LG 15.0-in TFT XGA	ON	ON	ON	OFF
Mitsubishi 12.1-in TFT SVGA	ON	OFF	ON	ON
Samsung 12.1-in TFT SVGA	ON	ON	OFF	OFF
Samsung 14.1-in TFT XGA	OFF	ON	ON	OFF
Sanyo 12.1-in TFT SVGA	OFF	OFF	ON	ON
Unipac 13.3-in TFT XGA	OFF	OFF	ON	OFF
Unipac 14.1-in TFT XGA	OFF	OFF	OFF	ON

As an example, the following figure shows the DIP switches set to OFF-ON-ON-ON:

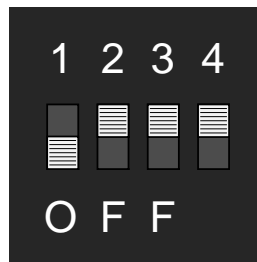


Figure 2-13. Video PCA DIP Switches

Removing the Top Case

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
3. Remove the eight retaining screws from the bottom case.

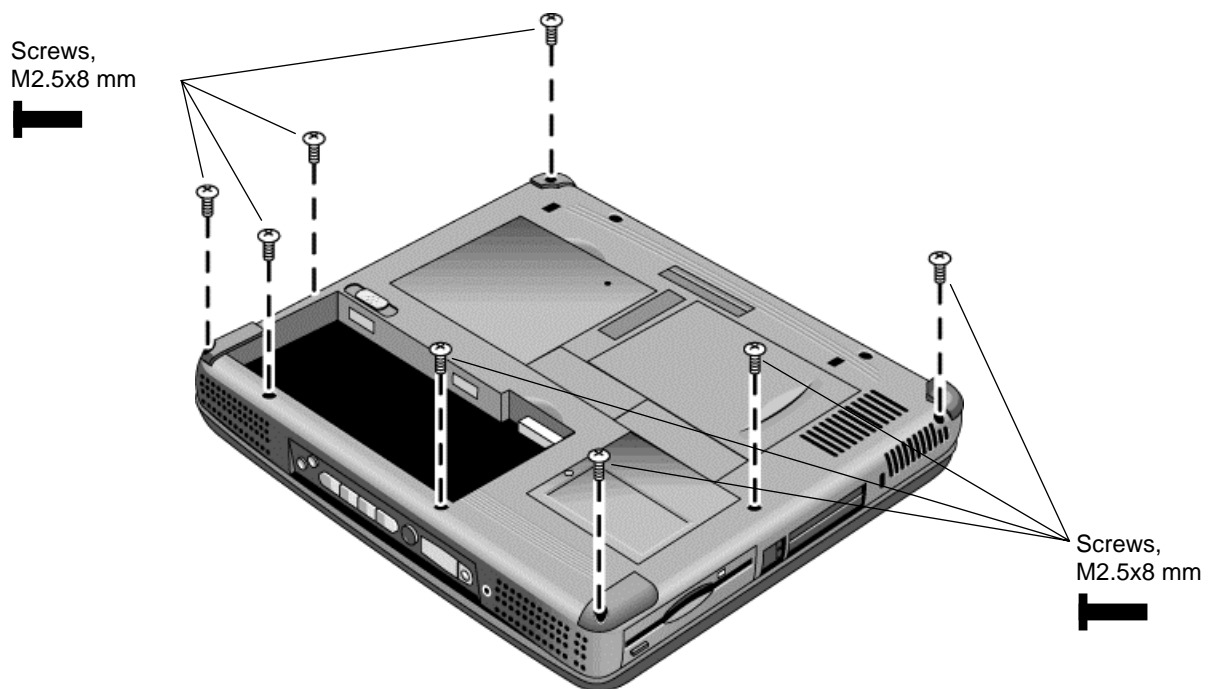


Figure 2-14. Removing the Top Case Retaining Screws

4. Disconnect the touch pad cable and speaker cable from the motherboard.
5. Remove the six retaining screws from the top case.
6. Raise the back of the top case, then gradually loosen the case, moving toward the front of the notebook (the right rear corner may require extra care to work free).
7. Carefully lift the top cover forward and off of the notebook. Be careful not to pull on the CD player PCA ribbon cable beneath the case.

8. Release the CD player PCA cable from the motherboard.

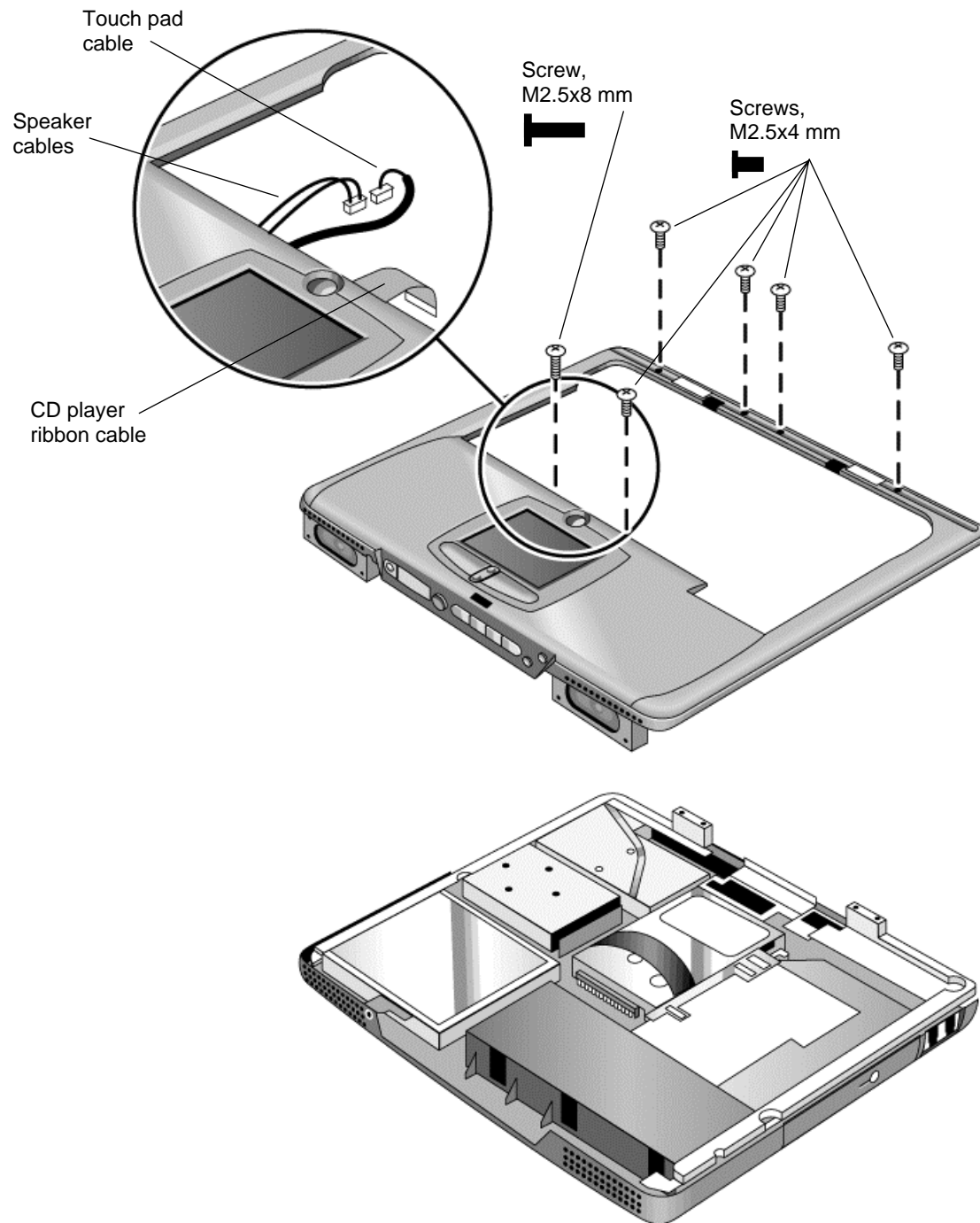


Figure 2-15. Removing the Top Case

Reassembly Notes

- Make sure the touch pad cable and speaker cable connectors are fully inserted squarely in their sockets.
- Make sure both tabs along the front of the case snap shut.

Removing the CD Player PCA

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
3. Remove both standoff screws (requires a 5mm socket driver), and lift the PCA out of the top case.

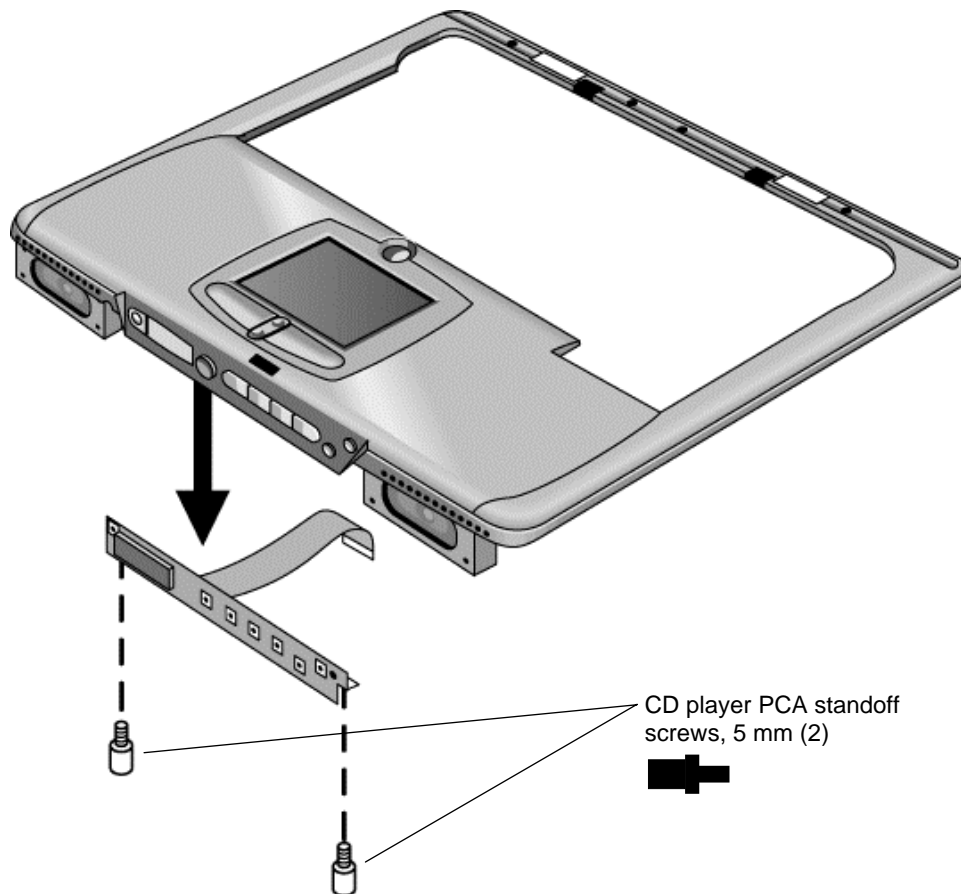


Figure 2-16. Removing the CD Player PCA

Removing the Hinge Saddle Set

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
3. Remove the two retaining screws from the bottom case.

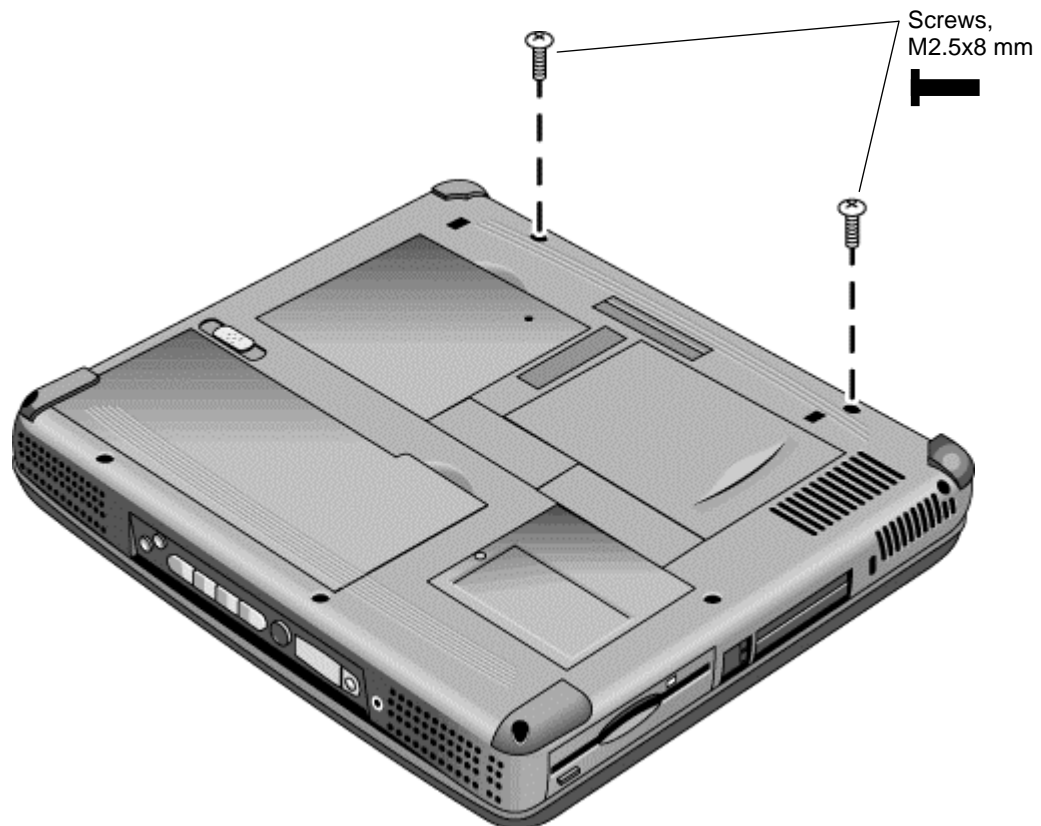


Figure 2-17. Removing the Hinge Saddle Retaining Screws

4. Remove the retaining screws from the back of the notebook, just below the display hinges.
5. Remove both retaining screws from the hinge saddle set.
6. Lift the hinge saddle set out of the notebook. You may need to free the hinge saddle from the clip in the bottom case near the LAN/modem ports to remove it.

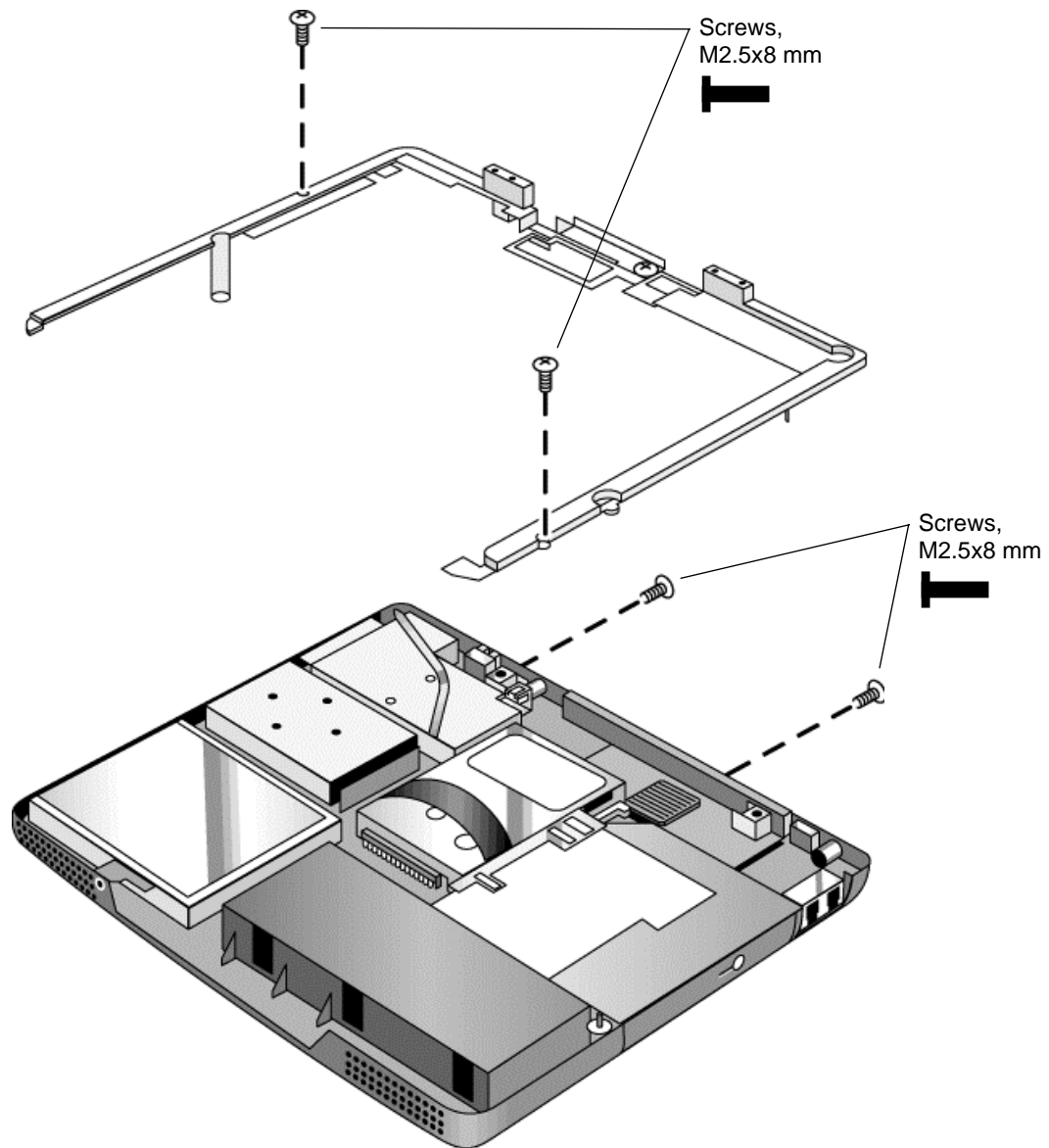


Figure 2-18. Removing the Hinge Saddle

Reassembly Notes

- Make sure the posts on the underside of the hinge saddle line up with the hinge support openings in the bottom case, and that the holes in the front ends of the saddle fit over the alignment posts in the bottom case.

Removing the Video PCA

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-23).
3. Note and record the settings of the PCA's DIP switches.

4. Remove all three retaining screws from the PCA, and carefully lift it off of the connectors underneath it.

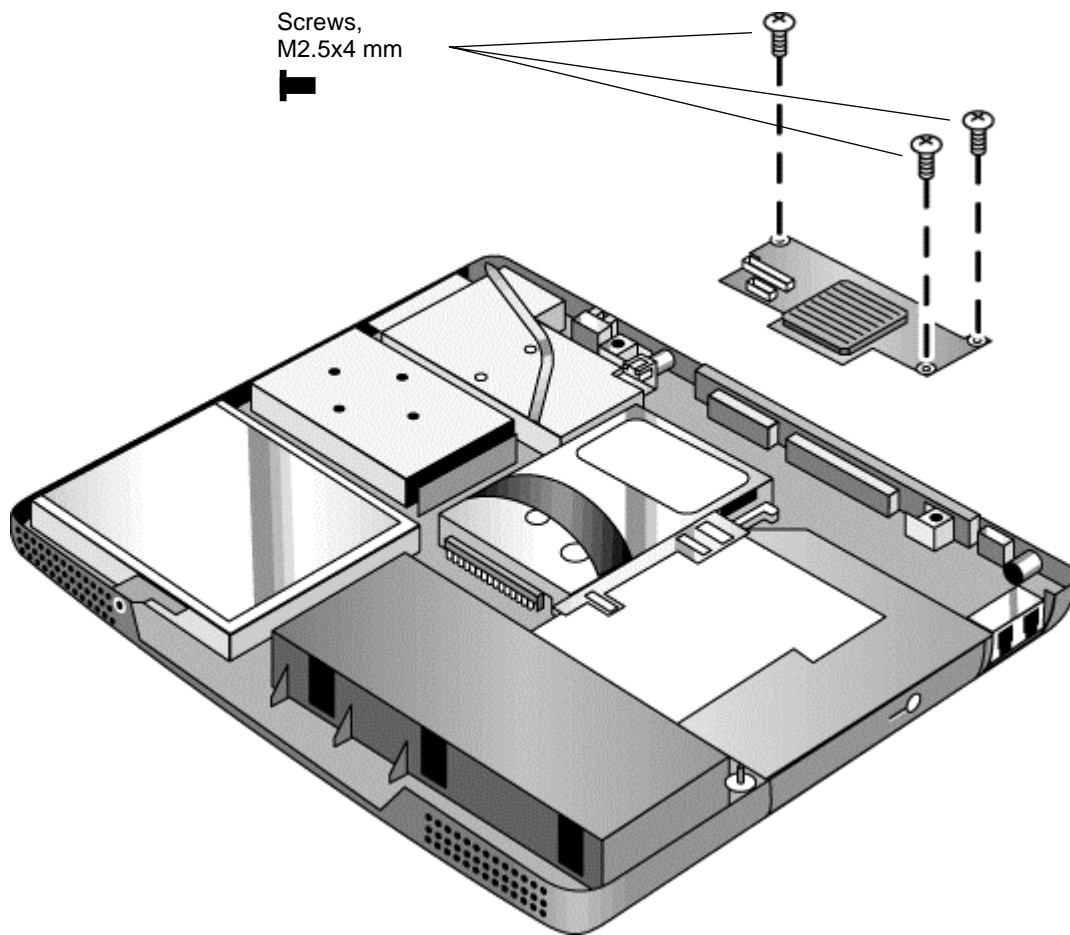


Figure 2-19. Removing the Video PCA

Reassembly Notes

- Set the DIP switches on the new PCA to match the settings from the PCA you are replacing and the notebook's display type. See "Installing a New Display Assembly" on page 2-19.

Removing the Heatsink Assembly (with Fan)

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-22).
3. Disconnect the fan cable from the motherboard.
4. Remove all four retaining screws (their springs are attached to them).
5. Lift the heatsink out of the notebook.

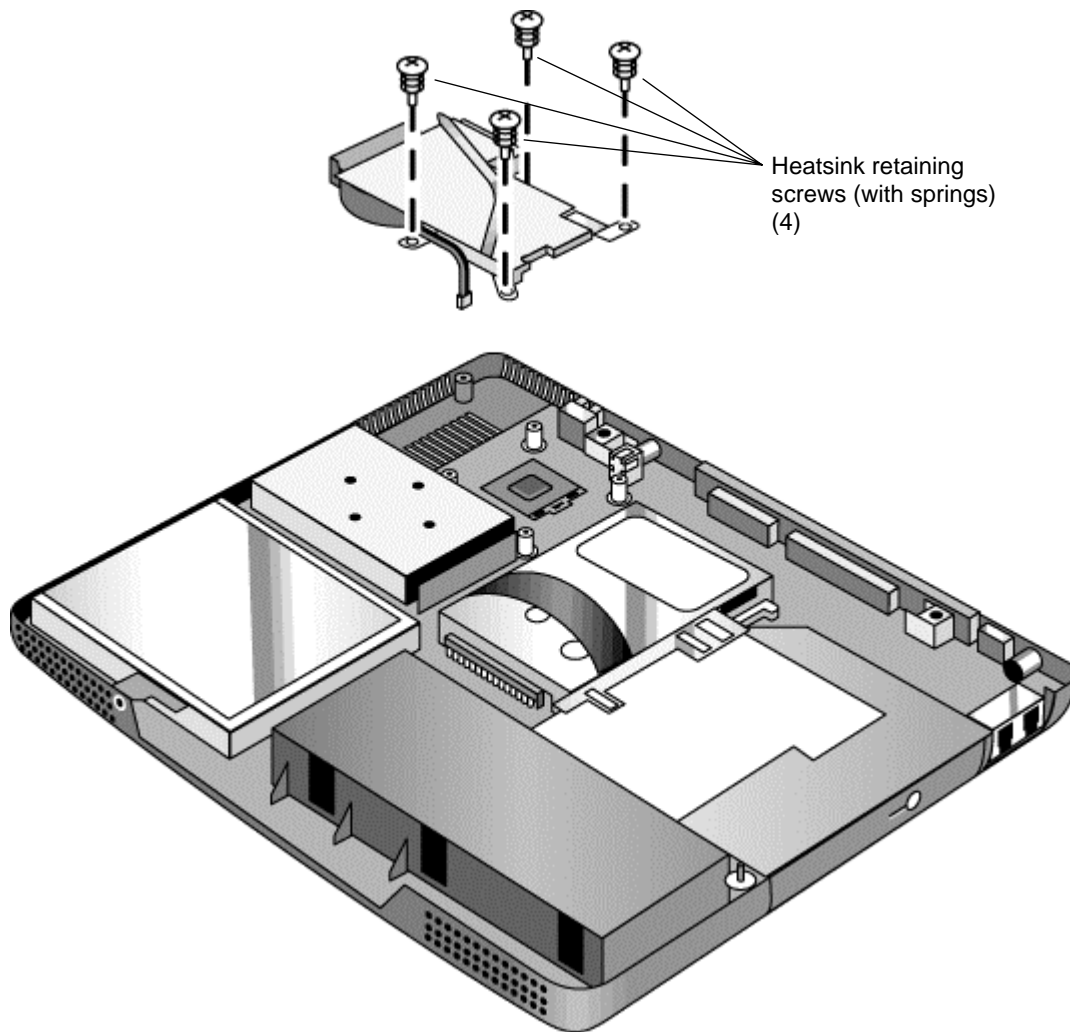


Figure 2-20. Removing the Heatsink Assembly

Reassembly Notes

- Make sure the fan cable is not pinned under the assembly.
- Make sure the thermal pad on the heatsink is not damaged, and replace if necessary.

Removing the CPU Module

(HP Authorized Service Providers Only)

See Table 4-1 on page 4-3 for a listing of replacement hard disk drives and part numbers.

Required Equipment

- Small Phillips screwdriver.
- Small flat-blade screwdriver.

Removal Procedure

Caution

Be careful not to touch the upper surface of the CPU module. Handle it only by its edges, or you could damage it.

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-22).
 - Heatsink assembly (page 2-27).
3. To release the CPU module from the motherboard, carefully insert the tip of the flat-blade screwdriver in the CPU module lock mechanism, and turn the screwdriver a few degrees counterclockwise until the mechanism clicks into its OPEN position. (The CPU socket moves slightly to the left when this happens.)
4. Grasp the CPU module by its edges, and carefully lift it straight up and off of its socket.

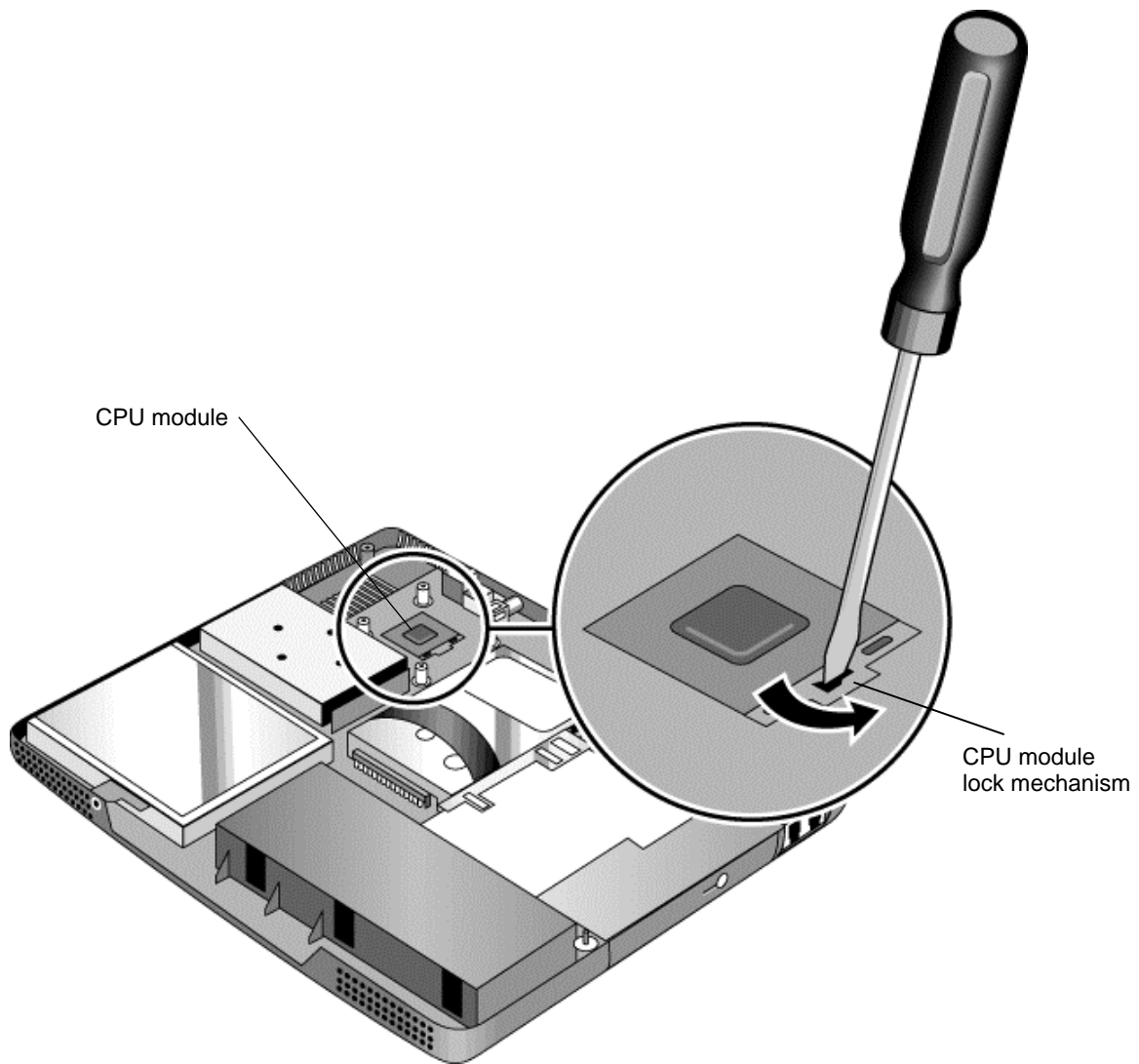


Figure 2-21. Removing the CPU Module

Reassembly Notes

- Make sure the module is fully seated on its socket, and that none of its pins are bent or otherwise damaged.
- Make sure the yellow triangle marked on the corner of the CPU module lines up with the corresponding yellow triangle on the corner of the socket.
- Carefully insert the tip of the flat-blade screwdriver in the CPU module lock mechanism, and turn the screwdriver a few degrees clockwise until the mechanism clicks into its LOCK position. (The CPU socket moves slightly to the right when this happens.)

Removing the Floppy Disk Drive

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-22).
2. Release the drive's ribbon cable from its connector on the motherboard.
3. Remove the two retaining screws.
4. Lift the floppy drive out of the notebook.

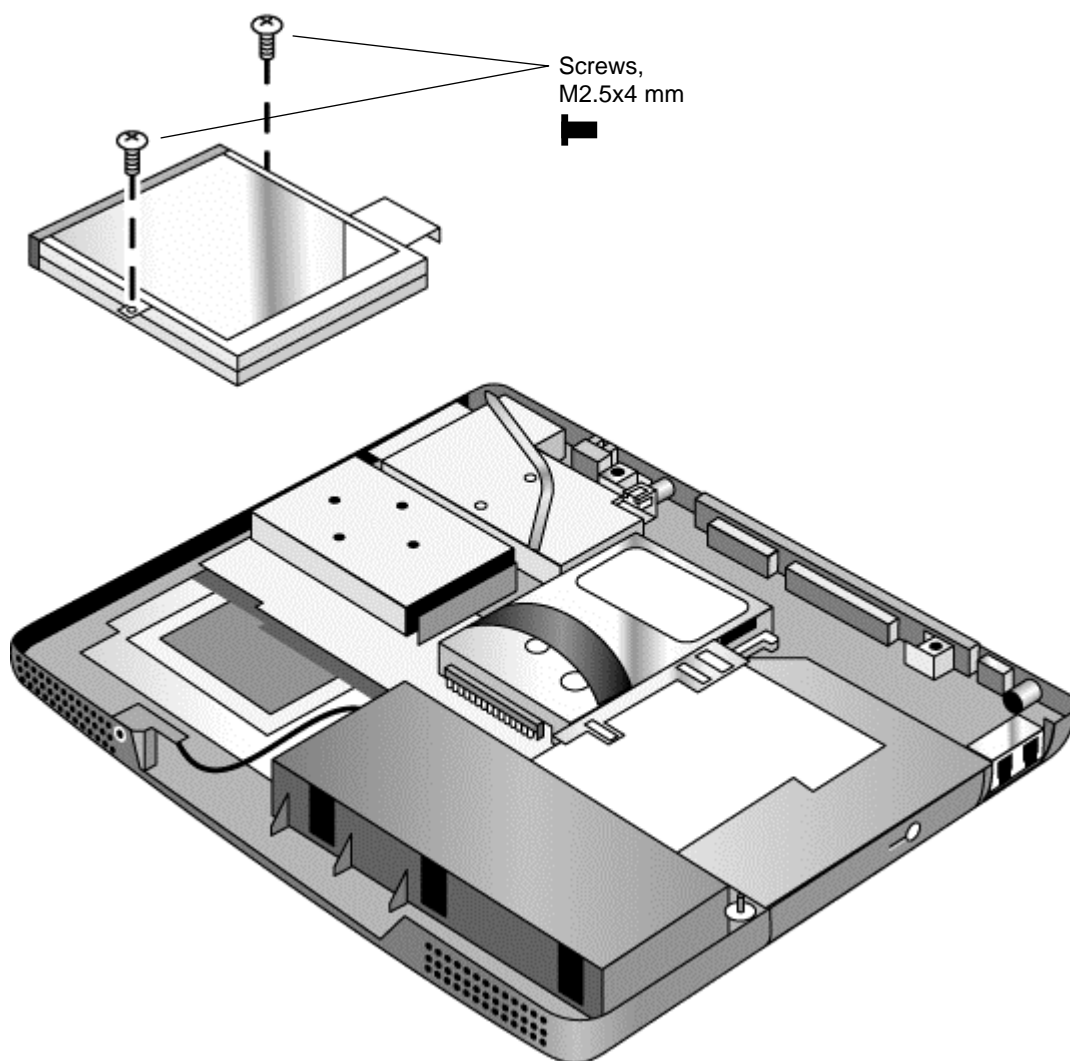


Figure 2-22. Removing the Floppy Disk Drive

Reassembly Notes

- Make sure the headphone PCA cable lies under the FDD bracket.

Removing the CD-ROM/DVD Drive

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Hard disk drive assembly (page 2-13).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-22).
2. Pull the CD-ROM or DVD assembly to the right, off of its connector and out of the notebook.

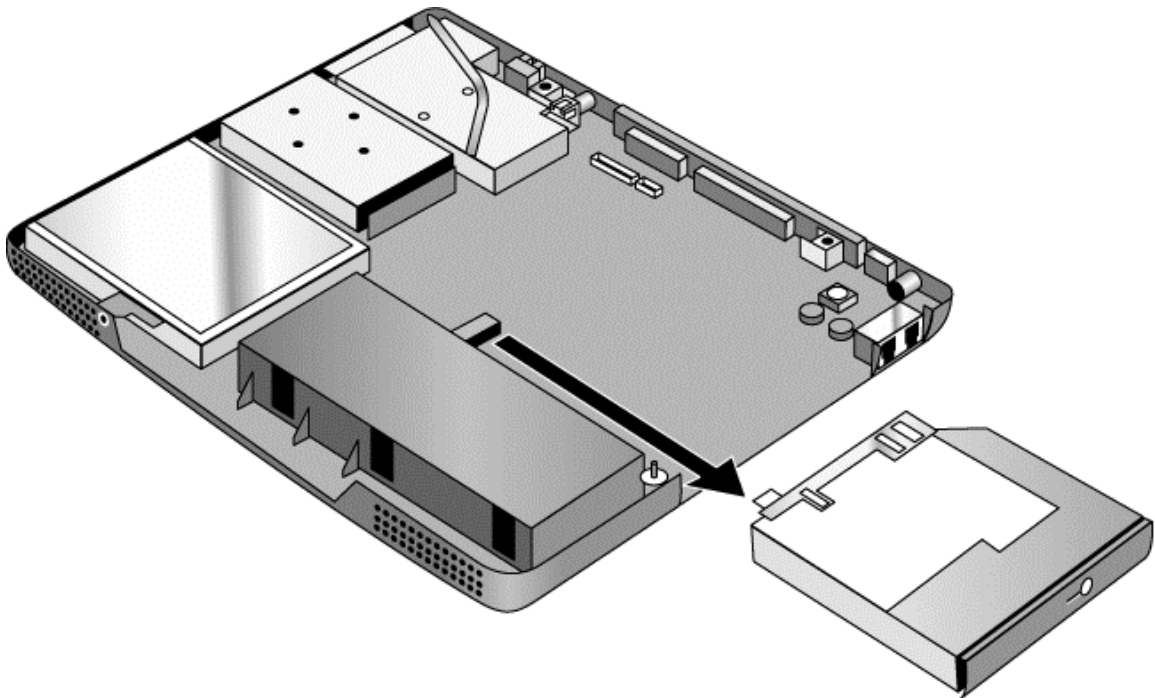


Figure 2-23. Removing the CD-ROM/DVD Drive

Reassembly Notes

- Place the assembly so that its connector aligns with that on the motherboard, then gently press the assembly to the left and into place.

Removing the Motherboard or Bottom Case

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.
- 5mm socket driver.

When Installing a New Motherboard

Before replacing the motherboard, you must (if possible) electronically store the motherboard's serial number and service ID for transfer to the new motherboard.

1. Exit Windows and boot to a DOS prompt:
 - For Windows 98 or ME, press F8 during reboot and select Command Prompt Only.
 - For Windows 2000, boot from a DOS boot floppy disk.
2. Run ESN.EXE from one of these sources:
 - On a factory software installation, change to the \HP\Drivers\Hputils directory and type **esn** at the prompt.
 - Otherwise, copy \HP\Drivers\Hputils\ESN.EXE from the Recovery CD, then run it on the notebook.
3. Save the serial number and service ID.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove these additional assemblies:
 - Battery (page 2-3).
 - SDRAM modules (page 2-5).
 - Mini-PCI card (page 2-7).
 - Keyboard cover (page 2-9).
 - Keyboard (page 2-11).
 - Hard disk drive assembly (page 2-13).
 - Display assembly (page 2-17).
 - Top case (page 2-19).
 - Hinge saddle set (page 2-22).
 - Video PCA (page 2-25).
 - Heatsink assembly (page 2-25).
 - CPU module (page 2-29).
 - Floppy disk drive assembly (page 2-29).
 - CD-ROM/DVD drive (page 2-33).
3. Remove all six standoff screws from the back of the notebook.
4. Remove both retaining screws from the motherboard.
5. Disconnect the cable (modem models only) or cables (modem/LAN models only) at the right rear corner of the motherboard.
6. Disconnect the cable from the headphone PCA.
7. Remove all four CPU standoffs.
8. Remove the clip from near the right rear corner of the motherboard.
9. Lift the front edge of the motherboard slightly, then lift the motherboard forward and out of the bottom case.
10. Remove the CPU support plate from the bottom case.

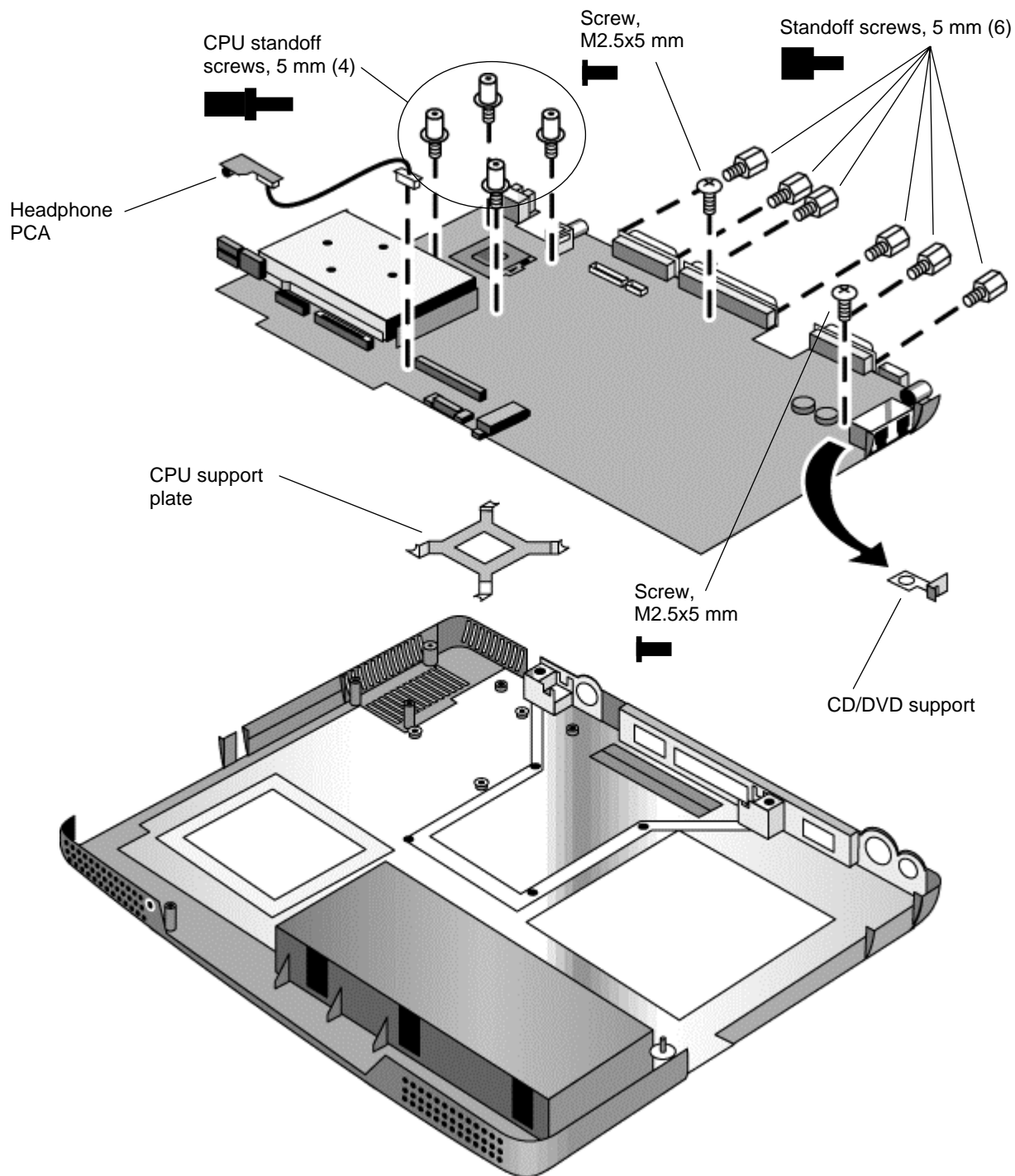


Figure 2-24. Removing the Motherboard

Reassembly Procedure

- When reinstalling the motherboard, see “Reinstalling the Motherboard” on page 2-37.
- When reinstalling the bottom case, see “Replacing the Bottom Case” on page 2-38.

Reinstalling the Motherboard

Reassembly Procedure

1. Install the CPU support plate.
2. Insert the I/O connectors through their openings in the bottom case, then lower the motherboard into place.
 - Be careful not to trap the modem or modem/LAN cable(s) under the motherboard (modem and modem/LAN models only).
 - Fit the modem cable through the notch on the edge of the motherboard, and make sure the LAN cable doesn't block the nearby screw tab.
 - Make sure the alignment posts in the bottom case fit through the holes at the back left and front right corners of the motherboard.
3. Reconnect the cable (modem models only) or cables (modem/LAN models only) at the right rear corner of the motherboard.

When Installing a New Motherboard

After installing a new motherboard, you must electronically transfer to it the serial number and service ID from the previous motherboard.

1. Exit Windows and boot to a DOS prompt:
 - For Windows 98 or ME, press F8 during reboot and select Command Prompt Only.
 - For Windows 2000, boot from a DOS boot floppy disk.
2. Run ESN.EXE from the same source you ran it from when saving the serial number and service ID from the previous motherboard:
 - On a factory software installation, change to the \HP\Drivers\Hputils directory and type **esn** at the prompt.
 - Otherwise, copy \HP\Drivers\Hputils\Esn.exe from the Recovery CD, then run it on the notebook.
3. Install the serial number and service ID.
 - If you are prompted for the serial number, type the serial number shown on the bottom of the case.
 - If a serial number has already been stored, you must call an HP support center to change it.

Replacing the Bottom Case

Installation Procedure

1. Install a new Microsoft Product ID label.
2. Transfer the old serial number label and install a new overlay, or create a new serial number label using the steps below.
3. If you need to install or replace the docking or PCMCIA doors, refer to the figures below.

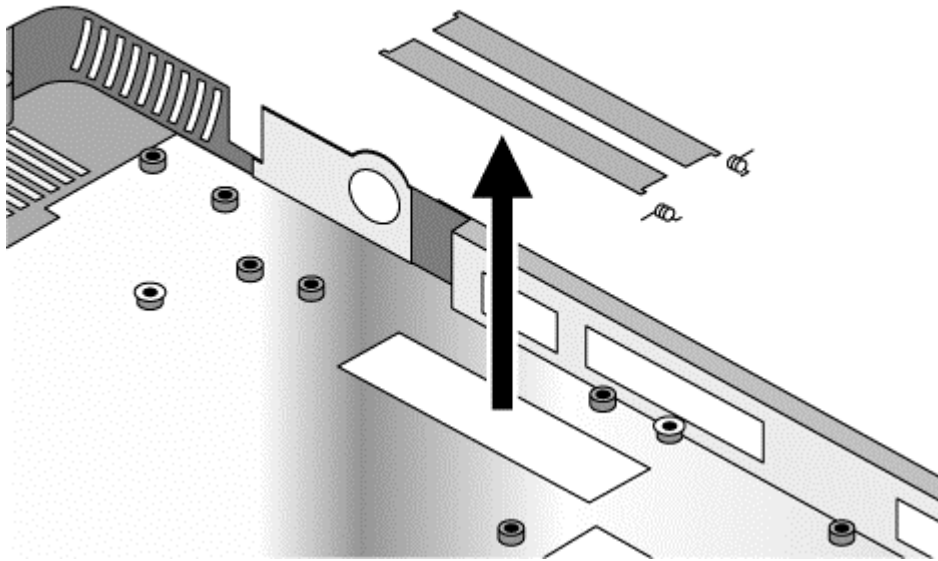


Figure 2-25. Installing Docking Doors

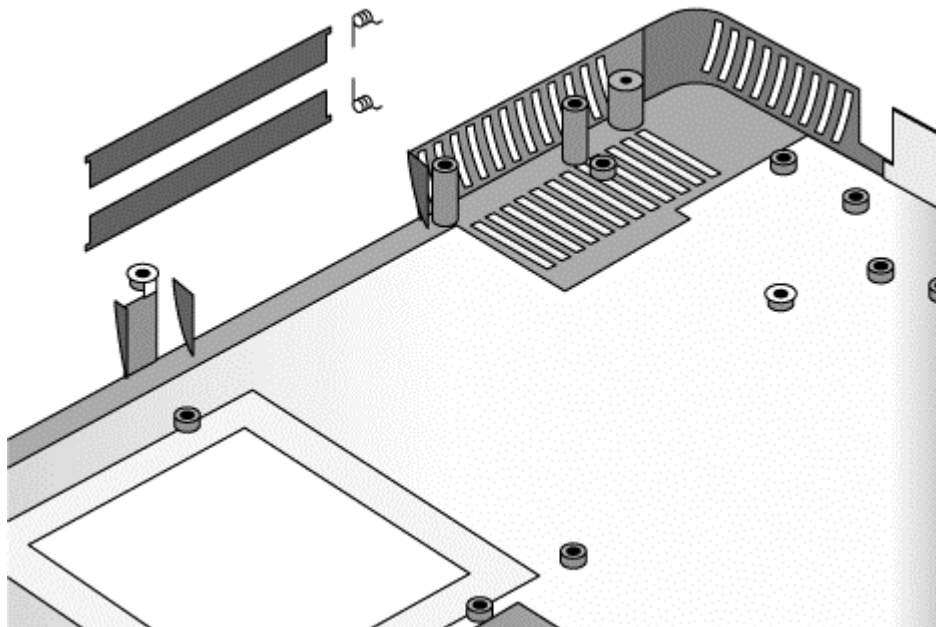


Figure 2-26. Installing the PCMCIA Doors

Installing a New Serial Number Label

Download the latest version of the serial number label template (Microsoft Word format) from the Partnership Web site (see page vii) under Support/Service in Technical Support Information, or from <http://www.mcd.hp.com>. Store it with other Word templates on a PC connected to a laser printer. The latest version includes fields for warranty period and manufacturing location.

1. Open a new document based on the serial label template.
2. Enter the information from the old serial label, and print the new label on plain white paper. The new label does not have barcodes.
3. Carefully cut out the new serial label just inside the border and place it into the inner recess in the bottom case. The bottom of the label goes toward the front of the case.
4. While holding the paper label in place, attach a serial label overlay into the outer recess. It covers and protects the serial label.

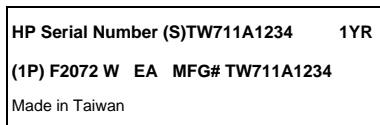


Figure 2-27. Example of Serial Number Label

Removing Notebook Components

(HP Authorized Service Providers Only)

Required Equipment

- Small Phillips screwdriver.
- Small flat-blade screwdriver.

Removal Procedure

1. Unplug the AC adapter, if present, and remove the battery.
2. Remove the assemblies and follow the additional steps given in the table below.

Table 2-1. Removing Notebook Components

Component	Removal Procedure	Additional Steps
Case, bottom	See page 2-34.	
Case, top	See page 2-19.	
Cover, keyboard	See page 2-9.	
CPU module	See page 2-29.	
Display assembly	See page 2-17.	
Doors, docking	Mini-PCI card (page 2-7). Keyboard cover (page 2-9). Keyboard (page 2-11). Hard disk drive assembly (page 2-13). Display assembly (page 2-17). Top case assembly (page 2-19). Hinge saddle set (page 2-22). Video PCA (page 2-25). Heatsink assembly (page 2-25). CPU module (page 2-29). Floppy disk drive assembly (page 2-31). CD-ROM/DVD drive (page 2-33). Motherboard (page 2-34).	See the figure on page 2-38.

Component	Removal Procedure	Additional Steps
Doors, PCMCIA	Mini-PCI card (page 2-7). Keyboard cover (page 2-9). Keyboard (page 2-11). Hard disk drive assembly (page 2-13). Display assembly (page 2-17). Top case assembly (page 2-19). Hinge saddle set (page 2-22). Video PCA (page 2-25). Heatsink assembly (page 2-25). CPU module (page 2-29). Floppy disk drive assembly (page 2-31). CD-ROM/DVD drive (page 2-33). Motherboard (page 2-34).	See the figure on page 2-39.
Drive, CD-ROM/DVD	See page 2-33.	
Drive, floppy disk	See page 2-29.	
Heatsink (with fan)	See page 2-25.	
Keyboard	See page 2-11.	
PCA, CD player	See page 2-22.	
PCA, headphone	Keyboard cover (page 2-9). Keyboard (page 2-11). Display assembly (page 2-17). Top case (page 2-19). Hinge saddle set (page 2-22).	Remove the retaining screw from the PCA, disconnect the cable to the motherboard, and lift the PCA out of the notebook. You can lift the floppy drive slightly for access.
PCA, motherboard	See page 2-34.	
PCA, switchboard	Keyboard cover (page 2-9). Keyboard (page 2-11).	Remove both screws (M2.5x4) from the PCA, and carefully lift the PCA off of the connector beneath it. <i>Be careful not to pull on the cable attached to the PCA.</i> Disconnect the cable from the PCA and remove the PCA from the notebook.
PCA, video	See page 2-25.	

Component	Removal Procedure	Additional Steps
Plate, CPU support	Mini-PCI card (page 2-7). Keyboard cover (page 2-9). Keyboard (page 2-11). Hard disk drive assembly (page 2-13). Display assembly (page 2-17). Top case assembly (page 2-19). Hinge saddle set (page 2-22). Video PCA (page 2-25). Heatsink assembly (page 2-25). CPU module (page 2-29). Floppy disk drive assembly (page 2-31). CD-ROM/DVD drive (page 2-33). Motherboard (page 2-34).	
Saddle, hinge set	See page 2-22.	
Socket, PCMCIA	Keyboard cover (page 2-9). Keyboard (page 2-11). Display assembly (page 2-17). Top case (page 2-19). Hinge saddle set (page 2-22).	Remove the four screws attaching the PCMCIA socket to the motherboard (M2.5x4), and remove the socket.

Troubleshooting and Diagnostics

This chapter includes troubleshooting and diagnostic information for testing the functionality of the notebook, and for identifying faulty modules:

- Troubleshooting information
 - Troubleshooting the problem (page 3-3).
 - Verifying the repair (page 3-3).
 - Suggestions for troubleshooting (page 3-4).
- Diagnostic tools
 - DiagTools diagnostic program (page 3-17).
 - Power-on self-test (page 3-24).
 - Sycard PCCtest 450 PC Card (page 3-27).
 - Desktop Management Interface (page 3-28).
 - BIOS Setup utility (page 3-30).

Troubleshooting

The suggestions in this section can help isolate and repair the cause of a problem. To ensure quality repair, HP recommends that you follow the basic troubleshooting steps shown in the illustration below.

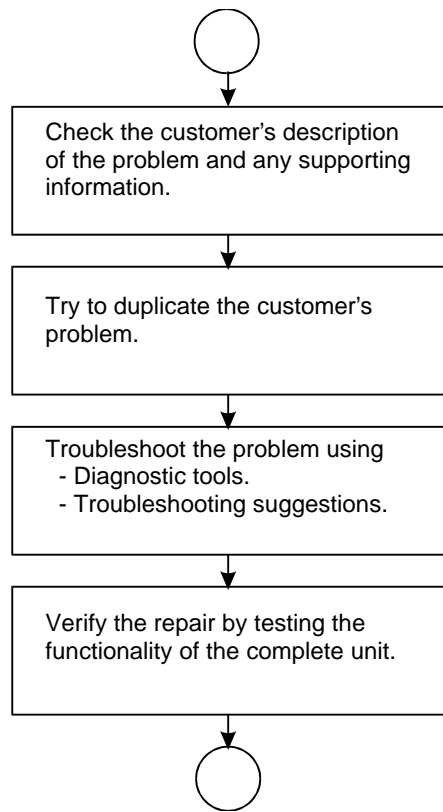


Figure 3-1. Basic Troubleshooting Steps

Troubleshooting the Problem

Record pertinent information about the notebook:

- Model and serial number.
- Operating system and version.
- BIOS version.
- Accessories and peripherals used.

Analyze the problem:

- **Observe Symptoms.** Using the customer's information, try to duplicate the problem. Determine how the problem differs from proper behavior. Also, take note of the functions that *do* work properly.
- **Separate Problems.** If there is more than one symptom, separate them into distinct problems.
- **Consider Causes.** Keep in mind possible causes for each problem. Use the diagnostic tools and troubleshooting suggestions to help find the possible causes.
 - The DiagTools diagnostic program tests most of the notebook's components using automatic and interactive tests, and will be your primary troubleshooting tool. Other tools include the power-on self-test, DMI/TopTools (if installed), the BIOS Setup utility, and the Sycard PCCtest. The table on page 3-4 shows how you can use these tools to isolate the cause of the notebook's problem.
 - The troubleshooting suggestions on page 3-5 include general suggestions for repairing units that show specific failure symptoms.

Swapping modules that may be defective with others known to be good is generally an ideal way to find the module responsible for the problem. A failure symptom is rarely caused by more than one module, so you will not usually need to replace more than one module to correct a particular failure.

After you replace a module, the notebook will normally be in a confused state and lock up when you apply power. If this happens, press the system-off switch: this resets the notebook, so that you can restart it in a known state.

Verifying the Repair

Before returning the repaired notebook to the customer, verify the repair by running the following tests:

- **DiagTools Basic Diagnostic Test.** Run the basic test of the DiagTools diagnostic program (page 3-17).
–and–
- **Function Tests.** Run tests that check the repaired function, such as in the DiagTools diagnostic program (page 3-17).
–and–
- **Failed Tests.** Run any other tests that failed during troubleshooting.

Suggestions for Troubleshooting

Table 3-1. Scope of Diagnostic Tools

Function	DiagTools	Power-On Self-Test	Sycard PCCtest 450	DMI/TopTools (if installed)	BIOS Setup
Bootup		Tests		Describes	Configures
Processor	Tests (System menu)	Tests		Describes	
Memory	Tests (Memory menu)	Tests		Describes	Describes
Battery				Describes	
Display	Tests (Video menu)			Describes	
Hard disk	Tests (IDE menu)	Tests		Describes	Configures
Floppy drive	Tests (FDD menu)	Tests		Describes	Describes
Keyboard	Tests (KBD menu)	Tests		Describes	
Audio	Tests (System, Misc menus)				Configures
Serial	Tests* (Misc menu)			Describes	Configures
Parallel	Tests* (Misc menu)			Describes	Configures
LAN	Tests** (User menu)			Describes	
Modem	Tests** (User menu)				
Infrared	Tests† (Misc menu)			Describes	Configures
PS/2 port	Tests† (KBD, Misc menus)				
USB	Tests† (USB menu)			Describes	
Docking port	Tests (using docks)				
PCMCIA	Tests (Misc menu)		Tests	Describes	
AC adapter				Status	
Docking products	Tests ports and internal bus			Status	Configures
CD-ROM drive	Tests (IDE menu)	Tests (with boot CD)		Describes	Configures
Other plug-in modules				Describes	
<p>* The diagnostic test is more thorough if you use a loop-back connector.</p> <p>** 3Com modem only; the test checks only the internal hardware up to the mini-PCI card, and does not check the mini-PCI panel or any external cabling.</p> <p>† Use an appropriate external device to exercise the port. See the help text for the tests in the menu.</p>					

If you cannot isolate the cause of a problem using the above diagnostic tools, use the suggestions in the following table to help find the problem.

Table 3-2. Troubleshooting Suggestions

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
To help determine likely causes, check to see what replaceable modules are involved in the system function and what roles they play. See the figure on page 1-18 and the table on page 1-18.			
Startup			
Does not boot on AC or battery.	Check power source. Press system-off switch to reset notebook, then press blue standby button to turn notebook on. Unplug AC adapter, remove battery, remove any PC cards, undock, then reconnect power and try again. Remove all but one SDRAM module and try again. Reinsert any other SDRAM modules and try again.	AC adapter. SDRAM module. CPU module. Video PCA. Motherboard. Display assembly. Hard drive.	Check AC adapter. Remove any SDRAM modules and try again. If power status light does not turn on, replace motherboard. If power status light turns on but display remains off, try external monitor. If monitor shows successful boot, replace display assembly. If monitor shows activity but BIOS does not complete, replace display assembly. If monitor is blank, replace switchboard PCA, replace motherboard. If power status light and display turn on and BIOS completes, but OS does not start from hard disk or from floppy drive, replace CPU module, then motherboard. If OS starts from floppy drive, reload hard drive, replace hard drive.
Beeps once, spins hard disk, repeats, but does not boot.		SDRAM module.	Make sure at least one SDRAM module is installed.
Does not boot on battery, but boots on AC.	Make sure battery is properly installed and fully charged. Check battery contacts. If available, try another battery.	Battery or contacts. Motherboard.	
Does not boot from floppy drive.	Make sure floppy disk is bootable. Make sure floppy drive is installed correctly. Use BIOS Setup to check boot order and make sure floppy boot is enabled as first boot device.	Floppy drive or contacts. Motherboard.	

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Does not boot from CD-ROM or DVD in CD-ROM/DVD drive.	Make sure CD-ROM or DVD is bootable. Use BIOS Setup to check boot order and make sure CD-ROM/DVD Drive is enabled as first boot device. Restart notebook. Test DVD drive with DiagTools diagnostics.	CD-ROM/DVD drive module. Motherboard.	
Error message such as "Invalid system disk" or "Auto IDE error".	Check for disk in floppy drive. Check boot order in BIOS Setup. Remove and reinstall hard drive.	Hard drive contacts. Hard drive.	If notebook boots from floppy drive, check for corrupt files on hard drive, reload hard drive, replace hard drive.
Sluggish startup or shutdown.	Run ScanDisk and Disk Defragmenter to check and optimize hard drive. Delete temporary and unneeded files.		Use suggestions shown at left.
Password forgotten.	Verify proper ownership, then follow removal procedure with owner and record appropriate data. See page 5-1.		User must call Technical Support and provide proof of ownership. Password removal is restricted to certain sites. See page 5-1.
Power/Battery			
No power.	Make sure charged battery is installed or AC adapter connected. Try another battery or AC adapter if available.	AC adapter. Battery. Motherboard.	
Does not run on battery; empty battery indication.	Check battery and contacts. Try another battery if available.	Battery or contacts. Motherboard.	
Notebook beeps.	Notebook beeps for 15 seconds when battery is low. Connect AC adapter or replace battery.	Battery.	
Notebook turns off immediately after turning on.	Battery is probably extremely low. Connect AC adapter or replace battery.	Battery.	
Battery does not charge.	Make sure AC adapter is connected properly and battery installed properly. Check battery contacts. If available, try another battery and AC adapter. Move notebook away from any nearby heat source. Unplug AC adapter and allow battery to cool down. Check for blocked air vents.	Battery or contacts. AC adapter. Motherboard. Heatsink assembly.	Check battery and AC adapter. Check heatsink assembly.
AC adapter does not power notebook.	Try another AC adapter, if available.	AC adapter. Motherboard.	AC adapter cannot be repaired, and must be replaced.

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Battery has short operating time.	<p>Turn down display brightness.</p> <p>Check Intel SpeedStep Technology settings in BIOS Setup Power menu. Try default setting.</p> <p>Check settings in Power Management in Control Panel.</p> <p>Certain applications can cause excess CPU and power usage. (User can get Intel Power Monitor from www.intel.com and monitor CPU load.)</p> <p>When using applications with automatic save feature (such as MS Word), extend save time or disable to reduce hard disk access and power usage.</p> <p>PCMCIA card use can affect battery life. Some PCMCIA cards draw power even while not in use.</p> <p>Heavy modem use can affect battery operating time.</p>	Battery. Motherboard.	Battery capacity often decreases after a year or more.
Battery indicator is inaccurate.	Time Remaining is an estimate based on how quickly the notebook is using power at that moment. It therefore depends on the current task, and assumes power will be used at the same rate until the battery runs out. So, for example, if the notebook is performing a task requiring a good deal of power (such as reading from a CD-ROM or DVD), the value will probably show too little time remaining.		
Display			
Dark display, no light.	<p>Make sure notebook is turned on.</p> <p>Check power supply.</p> <p>Adjust display brightness.</p> <p>Press Fn+F5 several times.</p> <p>Make sure SDRAM modules are installed properly.</p> <p>Make sure video PCA is installed properly.</p> <p>Make sure CPU module is installed properly.</p> <p>Try external monitor.</p>	<p>Display cable connection.</p> <p>SDRAM modules.</p> <p>Video PCA.</p> <p>CPU module.</p> <p>Display assembly.</p> <p>Motherboard.</p>	<p>Set DIP switch on video PCA to match label on display (see page 2-19).</p> <p>Check cable connection.</p> <p>Replace SDRAM modules.</p> <p>Replace CPU module.</p> <p>Replace display assembly.</p> <p>If external monitor displays no image, replace motherboard.</p>

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
White display.	Adjust display brightness.	Display assembly. Switchboard PCA.	
Erratic display.		Display cable connection. Video PCA. Display assembly. Motherboard.	
Bright or missing pixels or lines.	See quality statement on page 5-2.	Display cable connection. Display assembly.	See quality statement on page 5-2.
External display does not work.	Check connections. Press Fn+F5 several times. Check settings in BIOS Setup.	Motherboard.	
Display difficult to read or part of desktop not visible.	Check display resolution (default is 800 × 600 for 12.1-in displays, 1024 × 768 for others).		
Hard disk			
Hard disk never spins.	Check power source. Remove and reinstall hard drive. Check connector.	Hard drive or connector. Motherboard.	If drive case is damaged, drive may not operate properly.
Hard disk makes clunking or scratching noise.	Back up drive immediately. Was notebook or drive dropped?	Hard drive.	Check notebook and drive for evidence of customer abuse.
Hard disk makes buzzing or whining noise.	Back up drive immediately. Check hard drive installation. Check for alternate noise sources, such as PCMCIA drive or fan.	Depends on source of noise.	
Files are corrupted.	Run virus scan program. Check disk surface by running Scandisk (Windows 98) or by using Tools tab in disk's Properties sheet (Windows 2000). Test hard disk drive with DiagTools diagnostics. Use <i>Recovery CD</i> , to restore original factory software.		Use suggestions shown at left.
Drive capacity is less than normal.	Check disk surface by running Scandisk (Windows 98) or by using Tools tab in disk's Properties sheet (Windows 2000). Check partitions using FDISK (Windows 98) or Control Panel, Administrative Tools, Computer Management under Storage (Windows 2000).	Hard drive.	Use suggestions shown at left. Recreate Hibernation partition, then partition and format disk.

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Floppy drive			
General problems.	Make sure floppy drive is installed correctly. Check settings in BIOS Setup.	Floppy drive module or contacts. Motherboard.	
Drive does not write to 1.44-MB floppy disks.	Make sure floppy disk is not write-protected.	Floppy drive module.	
Drive reads from but does not write to 720- or 360-KB floppy disks.	Make sure floppy disks are not write-protected. Format floppy disks using DOS "format /f:720" or "format /f:360" command.	Floppy drive module.	
CD-ROM/DVD			
Particular CD-ROM/DVD not playing properly.	Check disk for dirt or damage, and clean with soft cloth or replace.		
DVD movie stops playing.	DVD may be double-sided. Movie may be paused. Press Play button.		
Region Code error.	DVD is intended for different world region.		
"System Error: Unable to read drive" message.	Make sure disk is clean and inserted correctly. Wait 5 to 10 seconds after closing tray before pressing Play. Restart notebook. Make sure CD-ROM/DVD drive is installed properly.	CD-ROM/DVD drive assembly. Motherboard.	
Keyboard			
Some or all keys do not work properly.	Check settings in BIOS Setup.	Keyboard. Motherboard.	Try reinserting ribbon cable in connector on motherboard.
External keyboard does not work.	Check settings in BIOS Setup.	External keyboard. Motherboard.	
Embedded numeric keypad does not work.	Press Fn+F8 to activate numeric keypad, and Lock key to turn on number lock. Avoid touching touch pad while booting or resuming.	Keyboard. Top case. Motherboard.	

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Touch pad			
General problems.	Slide and hold power button four seconds to reset notebook. Avoid touching touch pad while booting or resuming. Check settings in Control Panel. Make sure touch pad is enabled in Mouse Properties. Make sure touch pad is enabled in BIOS Setup. Check pointing stick settings in Control Panel.	Top case. Motherboard.	
Click button does not work.		Top case. Motherboard.	
Mouse			
External PS/2 mouse doesn't work.	Check connection. Put notebook in standby mode or shut down before attaching mouse. Install all drivers included with mouse. Restart notebook.	Mouse. Top case. Motherboard.	
Audio			
No sound is audible.	Increase sound volume (Fn+Up arrow, software controls, volume control up button). Make sure sound is enabled (software controls). Check for sound resource conflicts in Device Manager. Sound may not operate properly in MS-DOS mode. Check speaker cable connection.	Top case. Motherboard.	Check operation using headphones or external speakers.
Built-in microphone does not record.	Check software controls for recording sound. Make sure switchboard PCA is connected properly. Test audio with DiagTools diagnostics.	Switchboard PCA. Top case. Motherboard.	Check operation using external microphone.
PC card detection beep at startup is loud and cannot be adjusted.	Download latest audio driver from technical support area of HP Notebook web site (see page vii).		

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Serial/Parallel/USB			
General problems.	Check connections. Restart notebook. Check settings in BIOS Setup. Check settings in Control Panel. Use troubleshooters in Windows Help. Test ports with DiagTools diagnostics. For USB: contact device vendor and HP Notebook web site (see page vii) for latest USB drivers.	Serial device. Motherboard.	Use loop-back connector when testing serial or parallel port—see page 3-19.
Serial mouse doesn't work.	Make sure mouse was installed according to manufacturer's instructions.		
Serial modem doesn't work.	Use Modem Troubleshooter in Windows Help. Disable internal modem.		
Modem			
Modem will not connect at 56K.	Verify that host modem supports 56K (V.90) connection speed. Try connecting at later time in case line quality or other external factor is cause of problem.		

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Modem will not connect at any speed.	<p>Make sure notebook's modem is properly connected to wall telephone jack.</p> <p>Make sure telephone line is not already in use.</p> <p>Verify settings in Modems in Control Panel (Windows 98) or Phone And Modem Options (Windows 2000).</p> <p>Make sure parity, speed, word length, and stop bits match on sending and receiving modems.</p> <p>Restart notebook.</p> <p>Run Windows modem diagnostics or Windows Help Modem Troubleshooter.</p> <p>Open hardware Device Manager. If modem is disabled, try to enable it. If it has a conflict, try disabling another device.</p> <p>Use an analog telephone line (2, 3, or 4 wires), not a PBX or digital line. In a hotel, ask for a data line.</p> <p>Try disabling error correction and data compression.</p>	<p>Mini-PCI card.</p> <p>Motherboard.</p>	
General problems.	<p>If serial or PC card modem is not working, disable internal modem:</p> <ul style="list-style-type: none"> - Windows 98: Device Manager tab of System in Control Panel. - Windows 2000: Modems tab of Phone And Modem Options in Control Panel. <p>Download latest modem driver from technical support area of HP Notebook web site (see page vii).</p>	<p>Mini-PCI card.</p> <p>Motherboard.</p>	
One-Touch button problems			
Buttons not working properly.	<p>Make sure correct applications are associated with buttons in One-Touch tab of Keyboard in Control Panels.</p>	<p>Keyboard cover.</p> <p>Switchboard PCA.</p> <p>Motherboard.</p>	
On-screen display does not appear when button is pressed.	<p>Make sure Onscreen Display is enabled in One-Touch tab of Keyboard in Control Panels.</p>		

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Printing			
Serial or parallel printer doesn't print	Make sure printer is on. Make sure printer cable is securely attached at both ends. Make sure cable or cable adapter is appropriate for printer type. Use Print Troubleshooter in Windows Help.	Cable. Motherboard.	
Left edge of printed output is missing.	Try using 300-dpi print driver.		
LAN/Network			
General problems.	Check connections. Try connecting cable to a different computer. Check settings in BIOS Setup. Check settings in Control Panel. Make sure LAN cable is Category 3, 4, or 5 for 10Base-T operation, or Category 5 for 100Base-TX operation. Maximum cable length is 100 m (330 ft). Run DiagTools LAN test.	Mini-PCI card. Motherboard.	
Infrared			
General problems.	Infrared is disabled and no drivers installed as shipped. (Drivers are included.) Check settings in BIOS Setup. Remove any PC Cards from notebook (possible IRQ conflict). For fast-IrDA, check for DMA conflict with ECP parallel port.	Motherboard.	

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
PC card			
Miscellaneous problems.	Remove and reinsert PC card. Restart notebook. Try card in other slot or in another computer. If card requires an IRQ, make sure one is available in Device Manager. Check for conflicts or refresh device list in Device Manager. Check HP Notebook web site for installation instructions and information about supported PC cards (page vii). When using PC card in a docking system, insert or remove card while system is turned on. Download current drivers from card manufacturer's web site.	PC card. PCMCIA socket. Motherboard.	Using a flashlight, look for bent pins inside PCMCIA socket. If both slots have problems, replace motherboard. If only one slot has a problem, try replacing PCMCIA socket.
PC card modem not working.	Disable internal modem.		
Miscellaneous			
Out of memory error.	Use Memory Troubleshooter in Windows Help.	SDRAM module.	
Clock loses time.	Plug in AC adapter for 24 hours to charge CMOS battery.	Motherboard.	
Notebook gets abnormally hot.	Always set notebook on a flat surface, so air can flow freely around and underneath it. Make sure air vents are clear. Check heatsink installation. Games and other programs that drive CPU usage toward 100% can contribute, as can charging battery.	Heatsink.	Check heatsink for proper fan operation or damage.

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Notebook pauses or runs sluggishly.	<p>May be normal Windows behavior (background processing can affect response time).</p> <p>Certain background operations (such as virus scanning software) can affect performance.</p> <p>Press CTRL+ALT+DEL to see if an application is not responding.</p> <p>Restart notebook.</p> <p>If hard disk has spun down to conserve power, it can take several seconds to spin up. If needed, use Power Management in Control Panels to change hard disk time-out to match standby time-out.</p> <p>Some file browsers respond slowly while processing graphics or waiting for broken network connections to time out.</p> <p>Check for overheating—see previous symptom.</p> <p>If notebook's hard disk drive runs frequently (as indicated by notebook's hard disk drive access light) while notebook appears to be paused or running slowly, consider installing additional SDRAM.</p> <p>Check available free disk space. Delete temporary and unneeded files.</p> <p>Run BIOS Setup utility and set Intel SpeedStep Technology to Maximum Performance.</p>	<p>Heatsink.</p> <p>CPU module.</p> <p>Motherboard.</p>	<p>If notebook slows after period of continuous activity, check heatsink—see previous symptom.</p>
Notebook still on but stops responding.	<p>Press CTRL+ALT+DEL and end any application not responding.</p> <p>Slide and hold power button four seconds to turn off and reset notebook, then press blue standby button to turn notebook back on.</p> <p>If this fails, insert a straightened paper clip into system-off switch, then press blue standby button to turn notebook back on.</p>		

Symptom	Call Center: Suggestions	Repair Center: Likely Causes	Repair Center: Comments
Port replicator			
Docking product I/O problems.	Make sure AC power is connected to port replicator. Make sure notebook is fully inserted in port replicator. Check notebook's power supply. Check settings in BIOS Setup. Try using corresponding port on notebook while undocked.	Port replicator. Motherboard.	Test corresponding notebook ports while undocked. Port replicator is not repairable, and must be exchanged.
Notebook locks up when docking or undocking.	Make sure notebook has completely entered or resumed from standby or hibernate mode before docking or undocking.		

Diagnostic Tools

This section describes the following diagnostic tools you can use for troubleshooting and repairing the notebook:

- DiagTools diagnostic program (below).
- Power-on self-test (page 3-24).
- Sycard PCCtest 450 PC Card (page 3-27).
- Desktop Management Interface (page 3-28).
- BIOS Setup utility (page 3-30).

DiagTools Diagnostic Program

The DiagTools hardware diagnostic program (version 2.30G as of this writing) provides two levels of testing:

- Automated testing using a basic hardware test.
- Advanced testing using individual hardware tests.

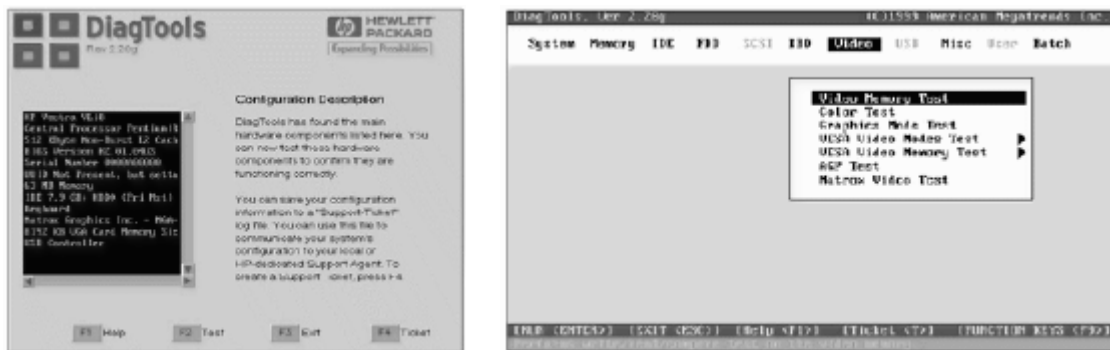


Figure 3-2. DiagTools Screens — Basic and Advanced

The tests are designed to run after the system restarts, so that the notebook will be in a predictable state during the tests. The tests are non-destructive, and are intended to preserve the state of the notebook. The notebook restarts when you exit the program so drivers can be loaded.

Updating DiagTools

You can download the latest version of DiagTools from the HP Notebook web site (see page vii). Follow the instructions included with the new version.

Running DiagTools

1. Restart the notebook.
2. When the HP logo appears, press F10 to start the diagnostic test.
3. When the initial diagnostics screen appears, press F2 twice to continue.
4. When the hardware detection finishes, check the list of detected hardware. The following information and devices should be listed if applicable:

Product name	Serial number	IDE drives
Processor type	Cache memory	Audio device
BIOS version	Main memory	

Note

If a device is not detected or fails its test, it might be configured incorrectly in BIOS Setup (see page 3-30). You can confirm this by running BIOS Setup and checking the settings.

5. **Run the basic test.** Press F2 to start the basic hardware test.

If the basic test fails, you can press F6 and start a Wizard that runs a set of advanced tests for the failed component. Then generate a support ticket.
6. If you intend to exit without running the advanced tests, press F4 to save system and test information in the Support Ticket log file. Then remove the floppy disk, if present, and press F3 to exit.
7. **Run the advanced tests.** Press F2 twice to open the advanced test screen.
8. Select and run the appropriate tests. Tests are not listed if no such hardware is detected. Press the following keys to run tests:

ENTER	Runs the highlighted test.
F5 or SPACE	Marks/unmarks the highlighted test.
F6	Marks/unmarks all tests in the current menu.
F7	Marks/unmarks all tests in all menus.
F10	Runs all marked tests.

(Press F9 for a list of all function keys.)

If any test fails, the error code is displayed temporarily, and the error code description is logged. If several errors occur, look for patterns that might indicate a common cause. See the table on page 3-20 for repair suggestions. Consider these suggestions in combination with other troubleshooting information.

9. When you are finished, press ESC to exit the advanced tests.
10. Press F4 twice (from the advanced test screen) or three times (from the basic test screen) to save system and test information in the Support Ticket log file. (You can save this to a floppy disk, or to the notebook's hard disk.) Press F7 to view the Support Ticket.
11. **Exit.** Press F3 twice to exit and restart the notebook.
12. **Optional: Check the log.** The log file contains a hardware summary and a list of all test results and errors. Run C:\Dmi\Hpdiags\Hpsuppt.exe to retrieve the log file to this directory and open it in Notepad.

Note that the serial and parallel port tests are more thorough if you connect a loop-back connector to the port before running the test for that port. See the wiring diagrams below.

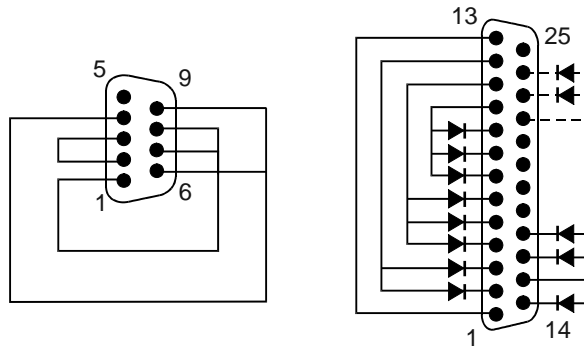


Figure 3-3. Serial and Parallel Loopback Connectors

Interpreting the Results

- The following table lists test groups, error codes, and suggestions for follow-up actions. Consider these suggestions in combination with other troubleshooting information.

Table 3-1. DiagTools Error Codes

Code	Suggestions	Code	Suggestions
System Tests		0160h	Remove all but one SDRAM module and repeat the test. Check the CPU module for shorts. Replace the CPU module. Replace the motherboard.
0001h – 0008h	Make sure the CPU module is seated properly. Replace the CPU module.	0170h – 0172h	Replace the motherboard.
0009h	Replace the CPU module. Replace the motherboard.	0180h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.
0010h – 0016h	Make sure the CPU module is seated properly. Replace the CPU module.	0181h	Enable external cache memory through BIOS Setup. Replace the CPU module.
001Eh	Make sure the CPU module is seated properly. Replace the CPU module. Replace the motherboard.	0182h	Unload HIMEM.SYS or any programs using the extended memory allocated by HIMEM.SYS.
0020h – 002Fh	Make sure the CPU module is seated properly. Replace the CPU module.	0183h	Check installation of the SDRAM module. Replace the SDRAM module. Replace the motherboard.
0030h – 0032h	Replace the motherboard.	0184h	Check installation of the SDRAM module. Replace the SDRAM module. Replace the CPU module. Replace the motherboard.
0040h	Replace the motherboard.	0190h – 01A0h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.
0041h	Run BIOS Setup and check IRQ assignments for all devices.	01A1h – 01A4h	Replace the CPU module.
0050h – 0052h	Replace the motherboard.	01B0h	Test with cache off. Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.
0060h – 0063h	Replace the motherboard.	01B1h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.
0070h	Replace the motherboard.	01B2h	Replace the SDRAM module (each 01000000h represents 16 MB).
0071h – 0076h	Reset the notebook, then run BIOS Setup and check settings. Replace the motherboard.	01B3h	Replace motherboard.
0077h	Replace the motherboard.	Hard Disk Tests	
0078h	Reset the system, then run BIOS Setup and check settings. Replace the motherboard.	0201h	Replace the hard disk. Replace the motherboard.
0079h	Replace the motherboard.	0202h, 0204h	Check test parameters and repeat the test. Replace the hard disk.
0083h – 008Ah	Replace the motherboard.	0205h	Replace the motherboard.
00C0h – 00CCh	Replace the CPU module.	0207h	Run BIOS Setup and check the hard disk type. Check the hard disk connection. Replace the hard disk. Replace the motherboard.
Memory Tests		0208h – 0209h	Transient DMA error. Repeat the test.
The addresses below are absolute (32-bit) addresses, and are not in the segment:offset format.		020Ah – 0211h	Repeat the test. Run SCANDISK or equivalent.
0100h – 0102h	Replace the motherboard.	0220h	Replace the motherboard.
0120h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.	0240h	Replace the hard disk. Replace the motherboard.
0130h	Test with cache off. Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.	0252h, 0254h	Re-enter test parameters and repeat the test. Replace the hard disk.
0131h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.	025Ah, 0260h	Repeat the test. Run SCANDISK or equivalent. Replace the hard disk.
0132h	Replace the SDRAM module (each 01000000h represents 16 MB).		
0135h – 0137h	Replace the SDRAM module (each 01000000h represents 16 MB).		
0140h – 0150h	Replace the SDRAM module (each 01000000h represents 16 MB). Replace the motherboard.		

Code	Suggestions
0265h	Check hard disk connection. Replace the hard disk. Replace the motherboard.
0275h	Replace the hard disk.
0280h	Check hard disk connection. Replace the hard disk. Replace the motherboard.
0281h	Replace the hard disk.
0290h	Repeat the test.
0293h, 0295h – 0296h	Replace the hard disk.
02AAh	Check hard disk connection. Replace the hard disk. Replace the motherboard.
02CCh	Re-enter the drive parameters and repeat the test. Run BIOS Setup and check the hard disk type. Replace the hard disk. Replace the motherboard.
02EEh	Run BIOS Setup and temporarily select a drive type that has more than 200 cylinders, then repeat the test.
02F1h	Reformat the hard disk. Recreate the Hibernation partition, then run FDISK to partition the hard disk.
02F3h	Run SCANDISK or equivalent. Reformat the hard disk. If necessary, recreate the Hibernation partition, then run FDISK to partition the hard disk.
02F4h – 02F5h	Reformat the hard disk. If necessary, recreate the Hibernation partition, then run FDISK to partition the hard disk.
02FFh	Check hard disk connection. Replace the hard disk. Replace the motherboard.
9602h – 9607h	(See Hard Disk Tests at end of table.)
Floppy Disk Tests	
0301h – 0304h	Replace the floppy drive. Replace the motherboard.
0305h	Run the Floppy Disk Controller test. Make sure the floppy diskette is fully inserted in the drive. Make sure the drive is properly installed. Replace the diskette. Replace the floppy drive. Replace the motherboard.
0306h	Replace the floppy drive.
0307h – 030Bh	Run the Floppy Disk Controller test. Make sure the floppy diskette is fully inserted in the drive. Make sure the drive is properly installed. Replace the diskette. Replace the floppy drive. Replace the motherboard.
030Ch	Replace the floppy drive.
Keyboard Tests	
0400h – 0401h	Replace the motherboard.
0410h – 0414h	Check the keyboard ribbon cable connection. Replace the keyboard. Replace the motherboard.
0415h	Replace the keyboard. Replace the switchboard PCA. Replace the motherboard.
0416h – 0418h	Replace the keyboard. Replace the motherboard.

Code	Suggestions
Serial Port Tests	
0601h	For the external loopback test, make sure the loopback connector is installed and constructed properly. For the external or internal loopback test, replace the motherboard.
0602h	Replace the motherboard.
0603h	For the external loopback test, make sure the loopback connector is installed and constructed properly. For the external or internal loopback test, replace the motherboard.
0604h – 0605h	Replace the motherboard.
0606h	For the external loopback test, make sure the loopback connector is installed and constructed properly. For the external or internal loopback test, replace the motherboard.
0607h	Make sure the loopback connector is installed and constructed properly. Replace the motherboard.
0608h – 0617h	Replace the motherboard.
Parallel Port Tests	
0701h	For the external loopback test, make sure the loopback connector is installed and constructed properly. For the external or internal loopback test, replace the motherboard.
0702h	Replace the motherboard.
0704h – 0706h	Replace the motherboard.
0707h	Connect the loopback connector.
0708h	Replace the motherboard.
Audio Tests	
0801h – 0805h	Check the speaker connection. Replace the top case. Replace the motherboard.
0806h, 0816h	If external speakers are being used, make sure the speakers are properly connected. Rerun the test. Replace the speakers that fail this test repeatedly.
08C0h – 08C2h	Check the speaker connections. Replace the top case. Replace the motherboard.
08D0h	Replace the motherboard.
08E0h – 08E4h	Replace the motherboard.
08F0h – 08F3h	Replace the motherboard.
Video Tests	
0900h – 0905h	Replace the video PCA. Replace the motherboard.
0911h	If this test fails on the internal display, replace the video PCA; replace the motherboard.
0912h – 0913h	Replace the video PCA. Replace the motherboard.
0920h	Replace the video PCA. Replace the motherboard.
0931h – 0933h	Replace the video PCA. Replace the motherboard.

Code	Suggestions
2100h – 2102h	Replace the display assembly. Replace the video PCA. Replace the motherboard. If error also occurs with external monitor, replace the motherboard.
2110h – 2120h	Replace the video PCA. Replace the motherboard. Replace the display assembly.
2130h	Replace the display assembly. Replace the video PCA. Replace the motherboard. If error also occurs with external monitor, replace the motherboard.
2140h – 2141h	Replace the video PCA. Replace the motherboard. Replace the display assembly.
2150h	Replace the display assembly. Replace the video PCA. Replace the motherboard. If error also occurs with external monitor, replace the motherboard.
9016h	Reset the notebook. Replace the motherboard.
9017h	See chapter 5 for cosmetic guidelines. If warranted, replace the display assembly.
CD-ROM Tests	
0A00h	Insert a CD in the drive.
0A01h	Repeat the test. Replace the CD-ROM drive.
0A02h	No repair. (Automatic close not supported.)
0A03h	Insert a different CD in the drive and repeat the test. Make sure the CD-ROM drive is installed properly. Replace the CD-ROM drive. Replace the motherboard.
0A04h	Insert a data CD in the drive and repeat the test.
0A05h	Insert a different CD in the drive and repeat the test. Make sure the CD-ROM drive is installed properly. Replace the CD-ROM drive. Replace the motherboard.
0A06h	Insert a data CD in the drive and repeat the test. Replace the drive.
0A07h	Repeat the test. Replace the drive.
0A08h	Insert an audio CD and repeat the test. Replace the drive.
0A09h	Repeat the test. Replace the drive.
0A10h – 0A11h	Insert an audio CD and repeat the test. Replace the drive.
0A12h	Insert a different multisession CD and repeat the test. Replace the drive.
SMBUS Tests	
0E00h – 0E20h	Replace the motherboard.
TI CardBus Tests	
1201h	Remove any attached ISA or PCI cards and repeat the test.
1202h – 1203h	Replace the motherboard.
1205h – 1206h	Insert a different PC Card and repeat the test. Replace the PCMCIA socket. Replace the motherboard.
1207h	Reset the notebook. Replace the motherboard.
USB Tests	
1301h – 1306h	Replace the motherboard.
1312h – 1316h	Replace the motherboard.

Code	Suggestions
9006h	(See USB Port Test below.)
ACPI Tests	
1701h – 1702h	Replace the motherboard.
DVD Tests	
1900h – 1902h	Insert a different DVD in the drive and repeat the test. Replace the DVD drive.
Fan Tests	
9001h	If the fan is already running, you may not hear a change. Check the heatsink connection. Replace the heatsink. Replace the motherboard.
9002h	Reset the notebook. Replace the motherboard.
USB Port Test	
9006h	Make sure a USB device is connected to the USB port being tested. Select the correct speed for the device. Try another USB device. Replace the motherboard (or dock component, if applicable).
IR Tests (FIR enabled, undocked)	
9002h	Reset the notebook. Replace the motherboard.
9007h – 9008h	Reset the notebook. Run BIOS Setup and restore default settings. Replace the motherboard.
9009h	Do not run this test in Windows. For the one-unit test, replace the motherboard. For the two-unit test, make sure the IR ports on the reflector and test computers are lined up. Replace the motherboard.
900Ah	Repeat the test. For the two-unit test, make sure the IR ports on the reflector and test computers are lined up. Replace the motherboard.
900Ch	Repeat the test. Make sure the IR ports on the reflector and test computers are lined up. Restart the reflector unit. Replace the motherboard.
Dock Tests	
9071h, 9073h	Update the notebook BIOS. Replace the dock's electronics PCA.
9075h, 9077h – 907Ah	Replace the dock's electronics PCA.
907Bh	Replace LED/button assembly in dock.
9082h	Rerun test with known good computer. Replace electronics PCA in dock.
9088h	Replace electronics PCA in dock.
Hard Disk Tests	
9602h	Failure may occur soon. Back up data and replace the hard disk.
9603h	Repeat the hard disk test. If other errors occur, follow the instructions for those errors.
9604h	Back up data if possible, then reinstall applications. Reformat the hard disk. If necessary, recreate the Hibernation partition, then run FDISK to partition the hard disk.

Code	Suggestions
9605h	Run full HDD test, For a notebook that does not give an F10 prompt at boot (no Hibernate partition) or that has a non-Windows operating system, this error may not indicate a failure. Otherwise, reformat the hard disk. If necessary, recreate the Hibernate partition, then run FDISK to partition the hard disk.

Code	Suggestions
9606h	Run the full HDD test. Reformat the hard disk. If necessary, recreate the Hibernate partition, then run FDISK to partition the hard disk.
9607h	Back up data if possible, then reformat the hard disk. Replace the hard disk.

Power-On Self-Test

Note

If Quiet Boot is enabled in BIOS Setup (the default setting), press ESC during boot to see POST messages.

The POST (Power-On Self-Test) is a series of initialization routines and diagnostic tests that the system BIOS runs when the notebook boots. The system BIOS will not boot the operating system if system memory, the CPU, DMA, or the interrupt controller fails the POST diagnostic tests. POST progress is indicated by a sequence of codes, and error messages are displayed if possible.

You should not necessarily interpret the failure of one or more POST tests as a hardware, software, or firmware failure. First, confirm the failure by performing a “clean” boot:

- Remove all accessories, including SDRAM modules, port replicator, PC cards, printer, external monitor, pointing device, and keyboard.
- Provide “clean” AC power—no auto adapter or unusual AC adapter configuration.
- Press the system-off switch to return the notebook to a known state.

If the notebook fails to boot with a clean boot, it requires repair. If an error message appears, *confirm the problem using other diagnostic tools*. Not all POST messages indicate a hardware, software, or firmware failure—some messages are for information only.

If the BIOS detects a terminal error condition, it halts POST after issuing a terminal error beep code (see the following table). The beep code indicates the POST routine in which the terminal error occurred.

Table 3-1. POST Terminal-Error Beep Codes

Beep Codes*	POST Description
1	One short beep before boot.
1-2	Search for option ROMs.
1-2-2-3	BIOS ROM checksum.
1-3-1-1	Test DRAM refresh.
1-3-1-3	Test 87570 Keyboard Controller (part of motherboard).
1-3-4-1	RAM failure on address line xxxx.
1-3-4-3	RAM failure on data bits xxxx of low byte of memory bus.
1-4-1-1	RAM failure on data bits xxxx of high byte of memory bus.
2-1-2-3	Check ROM copyright notice.
2-2-3-1	Test for unexpected interrupts.
1 long-2 short	Improper video configuration (check video PCA DIP switches, replace video PCA) or external ROM checksum failure.
1 long-5 short	Display DIP switches and EEPROM settings do not match (check DIP switch settings, reprogram EEPROM).
* Up to four groups of short beeps, except as noted.	

The following table lists POST messages and explanations for reported problems. If the system fails after you make changes in BIOS Setup, reset the notebook, enter BIOS Setup, and install the defaults or correct the error.

Table 3-2. POST Messages

Message	Description
0200 Failure Fixed Disk	Fixed disk is not working or not configured properly. Make sure the fixed disk is attached properly. Run BIOS Setup. Find out if the fixed-disk type is correctly identified.
0210 Stuck key	Stuck key on keyboard.
0211 Keyboard error	Keyboard not working.
0212 Keyboard Controller Failed	Keyboard controller failed test. May require replacing motherboard (contains keyboard controller).
0213 Keyboard locked – Unlock key switch	Unlock the system to proceed.
0220 Monitor type does not match CMOS – Run SETUP	Monitor type not correctly identified in BIOS Setup.
0230 Shadow RAM Failed at offset: <i>nnnn</i>	Shadow RAM failed at offset <i>nnnn</i> in the 64k block at which the error was detected.
0231 System RAM Failed at offset: <i>nnnn</i>	System RAM failed at offset <i>nnnn</i> in the 64k block at which the error was detected.
0232 Extended RAM Failed at offset: <i>nnnn</i>	Extended memory not working or not configured properly at offset <i>nnnn</i> . Update to the latest BIOS version.
0250 System battery is dead – Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Connect the AC adapter for at least 24 hours. Replace the motherboard.
0251 System CMOS checksum bad – Default configuration used	System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter BIOS Setup and enter your own values. If the error persists, check the system battery. Connect the AC adapter for at least 24 hours; replace the motherboard.
0260 System timer error	The timer test failed. Replace the motherboard.
0270 Real time clock error	Real-time clock fails BIOS test. May need to replace motherboard.
0280 Previous boot incomplete – Default configuration used	Previous POST did not complete successfully. POST loads default values and offers to run BIOS Setup. If failure was caused by incorrect values and these values are not corrected, the next boot will likely fail. This error is cleared the next time the system is booted.
0281 Memory Size found by POST differed from CMOS	Memory size found by POST differed from CMOS.
02B0 Diskette drive A error 02B1 Diskette drive B error	Drive A: or B: is present but fails the BIOS POST diskette tests. Make sure the drive is installed properly and defined with the proper diskette type in BIOS Setup.
02B2 Incorrect Drive A type – run SETUP	Type of floppy drive A: not correctly identified in BIOS Setup.
02B3 Incorrect Drive B type – run SETUP	Type of floppy drive B: not correctly identified in BIOS Setup.
02D0 System cache error – Cache disabled	RAM cache failed and BIOS disabled the cache. CPU may need to be replaced. A disabled cache slows system performance considerably.
02F0: CPU ID:	CPU socket number for Multi-Processor error.
02F4: EISA CMOS not writeable	BIOS test error: Cannot write to EISA CMOS.

Message	Description
02F5: DMA Test Failed	BIOS test error: Cannot write to extended DMA (Direct Memory Access) registers.
02F6: Software NMI Failed	BIOS test error: Cannot generate software NMI (Non-Maskable Interrupt).
02F7: Fail-Safe Timer NMI Failed	BIOS test error: Fail-Safe Timer takes too long.
device Address Conflict	Address conflict for specified device.
Allocation Error for: device	Resolve resource conflict for the specified device.
CD ROM Drive	CD ROM Drive identified.
Entering SETUP ...	Starting BIOS Setup program.
Failing Bits: nnnn	The hex number <i>nnnn</i> is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.
Fixed Disk n	Fixed disk <i>n</i> (0–3) identified.
Invalid System Configuration Data	Problem with NVRAM (CMOS) data.
I/O device IRQ conflict	I/O device IRQ conflict error.
PS/2 Mouse Boot Summary Screen:	PS/2 Mouse installed.
nnnn kB Extended RAM Passed	Where <i>nnnn</i> is the amount of RAM in kilobytes successfully tested.
nnnn Cache SRAM Passed	Where <i>nnnn</i> is the amount of system cache in kilobytes successfully tested.
nnnn kB Shadow RAM Passed	Where <i>nnnn</i> is the amount of shadow RAM in kilobytes successfully tested.
nnnn kB System RAM Passed	Where <i>nnnn</i> is the amount of system RAM in kilobytes successfully tested.
Operating system not found	Operating system cannot be located on drive A: or drive C:. Enter BIOS Setup and see if fixed disk and drive A: are properly identified.
Parity Check 1 nnnn	Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.
Parity Check 2 nnnn	Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????.
Press <F1> to resume, <F2> to Setup, <F3> for previous	Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter BIOS Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an Option ROM, such as an add-on card). Write down and follow the information shown on the screen.
Press <F2> to enter Setup	Optional message displayed during POST.
PS/2 Mouse:	PS/2 mouse identified.
System BIOS shadowed	System BIOS copied to shadow RAM.
UMB upper limit segment address: nnnn	Displays the address <i>nnnn</i> of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.
Video BIOS shadowed	Video BIOS copied to shadow RAM.

Sycard PCCtest 450 CardBus Card (Optional)

The PCCtest 450 CardBus Card (version 1.05) available from Sycard Technology is the only recommended diagnostic tool that tests the functionality of the PCMCIA slots using a PCMCIA card. It is a Type II CardBus Card that works with compatible test software to exercise PCMCIA functions. (For details, see the Sycard Technology Web site: <http://www.sycard.com>.) The PCCtest 450 product contains these components:

- PCCtest 450 CardBus Card, version 1.05.
- PCCtest 450 software disk. (Software updates are available at the Sycard Technology Web site: <http://www.sycard.com>.)
- Configuration headers (PC Card/16-bit and CardBus/32-bit) that attach to the card.

In addition, you will need this item:

- CardBus extender card (such as the Sycard PCCextend 70) to avoid wear on the Sycard PCMCIA connector.

The Sycard PCCtest 450 provides the following tests. See the Sycard documentation for details about running the tests.

Table 3-1. Sycard PCCtest Commands

	Slot	PCMCIA PC Card (16-bit) test (PC Card configuration header)	CardBus (32-bit) test (CardBus configuration header)
XE3/N5000 (technology code GC) (PCI1420)	Upper	PCT450 -1 -v -b75	TESTCB -1 -v -b75
	Lower	PCT450 -0 -v -b75	TESTCB -0 -v -b75

Desktop Management Interface (DMI)

The Desktop Management Interface (DMI) is basically a set of rules for accessing information about a personal computer. Using DMI, an application program can determine, for example, which hardware and software components are present in the computer, the operating system being used, and the number of accessory board slots available. Using the DMI interface, a local or remote application program can check which hardware and software components are installed on your notebook, and may be able to tell how well they are working or whether any needs replacing. All this information is stored in a special Management Information Format (MIF) file, installed on each computer as part of the DMI package.

Installing the DMI Package

The DMI package is included with your notebook, but must be properly installed before it can be used. Install the package as follows.

To install the DMI preloaded on the hard disk:

- In Windows, click Start, Programs, HP TopTools for Notebooks, Setup.

To install the DMI from the *Recovery CD*, or from floppy disks:

1. Insert the *Recovery CD*, into the CD-ROM/DVD drive, or insert disk #1 into the floppy drive.
2. Select and run the SETUP program from the dmi\disk1 directory on the CD (under \hp\Drivers), or from floppy disk #1.

Contents of the DMI Package

The DMI software and associated documentation is supplied either preinstalled on the notebook's hard disk drive or on the *Recovery CD*. The contents of the package are the same for both.

Since the information accessed by the DMI software is specific to each particular computer, it must be installed on each computer separately. The DMI package included with a notebook can therefore be used only with that notebook.

The DMI package includes the following software:

- A Microsoft Windows utility (SETUP.EXE) to install and initialize the DMI software.
- A Windows utility, HP TopTools. After DMI is installed, this utility can display information about the notebook through the DMI.
- A Management Information Format (MIF) file. This file contains information about everything on the notebook that can be controlled using DMI facilities, and is initialized during installation.
- A component code, identifying the version of MIF file to use for specific models of HP notebook computers.
- Windows-compatible DMTF Service Layer software, which controls access to the DMI.
- A client agent. The HP Remote DMI Agent is a DMI application and also a network server-side stream-based application. The Remote Agent is listening for Remote Application connection requests. If the main window of the Remote Agent is hidden, then no icon appears on the screen when it is running.

Using the DMI Interface

For a complete explanation of how to take full advantage of DMI, see the following documentation (provided with your notebook):

- A README.TXT file.
- A Windows online help file describing Hewlett-Packard's implementation of DMI (group and attribute definitions). Since not all models support all of Hewlett-Packard enhanced features, this document also describes any restrictions that apply.

Description of DMI

The Desktop Management Interface (DMI) is the result of the efforts of the Desktop Management Task Force (DMTF) founded in 1992 by a group of leading computer manufacturers—including Hewlett-Packard—to define a standard method of managing the physical and logical components of personal computers.

Hewlett-Packard has developed a number of extensions to DMI to allow it to manage the enhanced features of HP notebook computers, including passwords and tattooing (identifying a computer using a unique string of characters).

For full details of the structure of the MIF file (including an explanation of the fields of groups and attributes, and how to write an application program that accesses this information), access the DMTF FTP server <ftp.dmtf.org> or the DMTF web pages at the <http://www.dmtf.org>.

Uninstalling the DMI Package

1. Click Start, Programs, HP TopTools for Notebooks, Uninstall DMI.
2. Restart the notebook.

BIOS Setup Utility

The BIOS Setup utility provides access to basic configuration settings. It is independent of the operating system.

Running the BIOS Setup Utility

1. Close all applications, then click Start, Shut Down, Reboot. (If necessary, you can press CTRL+ALT+DEL to reboot.)
2. When the HP logo appears, press F2 to enter the BIOS Setup utility.
3. The pointing devices are not active in BIOS Setup, so you will need to use the keyboard to navigate:
 - Press the LEFT and RIGHT arrow keys to move among menus.
 - Press the UP and DOWN arrow keys to move among parameters in a menu.
 - Press F5 or F6 to move through values for the current parameter, or press ENTER to change a setting.
4. After you select the options you want, press F10 or use the Exit menu to exit BIOS Setup.

If the settings cause a conflict between devices during reboot, the system prompts you to run BIOS Setup again, and marks the conflicting settings.

Table 3-1. BIOS Setup Menus and Parameters

OmniBook XE3: Introduced with BIOS version GC.M1.00 (Summer 2000).		
Main Menu	Description	Default
BIOS Revision	Shows the current BIOS version.	Detected automatically
System Time	Sets the time using 24-hour format. Values set take effect immediately.	
System Date	Sets the date using mm/dd/yy format.	
Floppy Drive	Sets the floppy drive type.	Detected and set automatically
Internal Hard Disk	Sets the hard disk drive type and various drive parameters.	Detected and set automatically
Quiet Boot	When enabled, hides summary of power-on self-test and messages during boot.	Enabled
Video Display Device	Sets whether the notebook automatically switches to an external display if one is detected (Auto), or uses both the built-in and external displays (Both).	Auto
Video Expansion	When enabled, the video image covers the entire display in lower resolution modes. When disabled, the video image is centered in the display.	Disabled
Television Type	NTSC or PAL standard.	NTSC
Base Memory	Shows the system memory size.	640 KB
Extended Memory	Shows the extended memory size.	Detected automatically
CPU Serial Number	When enabled, makes Intel CPU serial number available to software.	Enabled

System Devices Menu	Description	Default
PS/2 Pointing Devices	Enables (Both) or disables (Auto) the internal pointing devices when an external PS/2 mouse is connected.	Auto
External Fn Key	Sets whether left CTRL+left ALT on an external keyboard is interpreted as the Fn key.	Enabled
IDE Controller	Enables the primary channel, secondary channel, both, or neither (disabled).	Both
FDD Controller	Enables the floppy drive.	Enabled
Serial Port	Sets whether the serial port is active, and whether it is configured automatically or by the user.	Enabled
Base I/O address	Sets the I/O address and interrupt.	3F8h, IRQ4
Infrared Port	Sets whether the infrared port is active, and whether it is configured automatically or by the user.	Disabled
Mode	Sets the hardware to support FIR (Fast IR) or SIR (Standard IR) infrared communications.	FIR
Base I/O address	Sets the I/O address and interrupt.	2F8h, IRQ3
DMA channel	Sets the DMA channel for Fast IR (FIR) mode.	DMA0
Parallel Port	Sets whether the parallel port is configured by the user, automatically, or not at all.	Enabled
Mode	Sets the port to normal mode (output only), bi-directional, ECP, or EPP.	ECP
Base I/O address	Sets the I/O address (except in EPP mode).	378h
Interrupt	Sets the interrupt.	IRQ7
DMA channel	Sets the DMA channel for ECP mode.	DMA3
LCD Status Panel Display	Enables display on the status panel.	Enabled
LCD Status Panel Date Format	Sets the date format used in the status panel	mm/dd/yy
LCD Status Panel Time Format	Sets the time format used in the status panel.	hh:mm, AM/PM (24-hour format)
Security Menu	Description	Default
User Password is	Shows if a user password is set.	Clear
Administrator Password is	Shows if an administrator password is set.	Clear
Set User Password	Press ENTER to set, change, or clear the user password. (The administrator password must be set first.) The password can have no more than 8 characters (0–9, A–Z), and cannot include special or accented characters.	Enter
Set Supervisor Password	Press ENTER to set, change, or clear the administrator password, which protects BIOS Setup settings. The password can have no more than 8 characters (0–9, A–Z), and cannot include special or accented characters.	Enter
Password Required to Boot	Sets whether a user password is required when the notebook boots. Requires the administrator password for changes.	Disabled
Floppy Boot	Sets whether the notebook will attempt to boot from the floppy disk drive.	Enabled

Power Menu	Description	Default
Intel SpeedStep Technology	Sets CPU high-/low-speed mode: – Auto: boot at high speed on AC, low speed on battery. – Reversed: boot at low speed on AC, high speed on battery. – Battery Optimized: boot at low speed. – Maximum Performance: boot at high speed. – Disabled: boot at low speed, no runtime support.	Auto
Auto Turn-On on Dock	Sets whether the notebook turns on automatically after docking.	Enabled
Boot Menu	Description	Default
Floppy Drive Hard Disk CD-ROM/DVD Drive	Shows the order of boot devices. Move the entries to change the order.	1. Floppy Drive 2. Hard Disk 3. CD-ROM/DVD drive
Exit Menu	Description	
Saving Changes and Exit	Saves Setup changes, then exits and reboots.	
Discarding Changes and Exit	Discards any Setup changes made since last save, then exits and reboots. Does not affect security, date, or time changes.	
Get Default Values	Restores default settings, and remains in Setup. Does not affect security, date, or time changes.	
Load Previous Values	Discards any Setup changes made since last save, and remains in Setup. Does not affect security, date, or time changes.	
Save Changes	Saves Setup changes, and remains in Setup. Security settings are saved when changed.	

Updating the Notebook's BIOS

Hewlett-Packard may from time to time provide updates to the notebook's BIOS. These updates will be available from the technical support area of the HP Notebook web site (see page vii). Download the update and follow the instructions in the readme.txt file to create a BIOS update floppy disk.

Caution

The BIOS update completely replaces the previous BIOS, so follow these directions exactly or you might damage the notebook. The BIOS update also resets the configurations in the BIOS Setup utility, and erases any BIOS passwords, so you should record these before performing the update.

Once you have created the BIOS update floppy disk, use it to update the notebook's BIOS as follows:

1. Undock the notebook if it is docked, and remove any PC cards from it.
2. Connect the AC adapter to the notebook.
3. Insert the BIOS update disk in the floppy disk drive.
4. Restart the notebook by pressing the blue standby button.
5. Follow the instructions that appear on-screen. Do not interrupt the process once it begins or you might damage the notebook.
6. When the process is complete, remove the BIOS update disk from the notebook, then reset the notebook by pressing its system-off switch.
7. Restart the notebook by pressing the blue standby button.

Replaceable Parts

This chapter contains an exploded view of the XE3 and the following lists of parts:

- Replaceable parts (page 4-3).
- Accessory replacement parts (page 4-5).
- Part number reference (page 4-6).

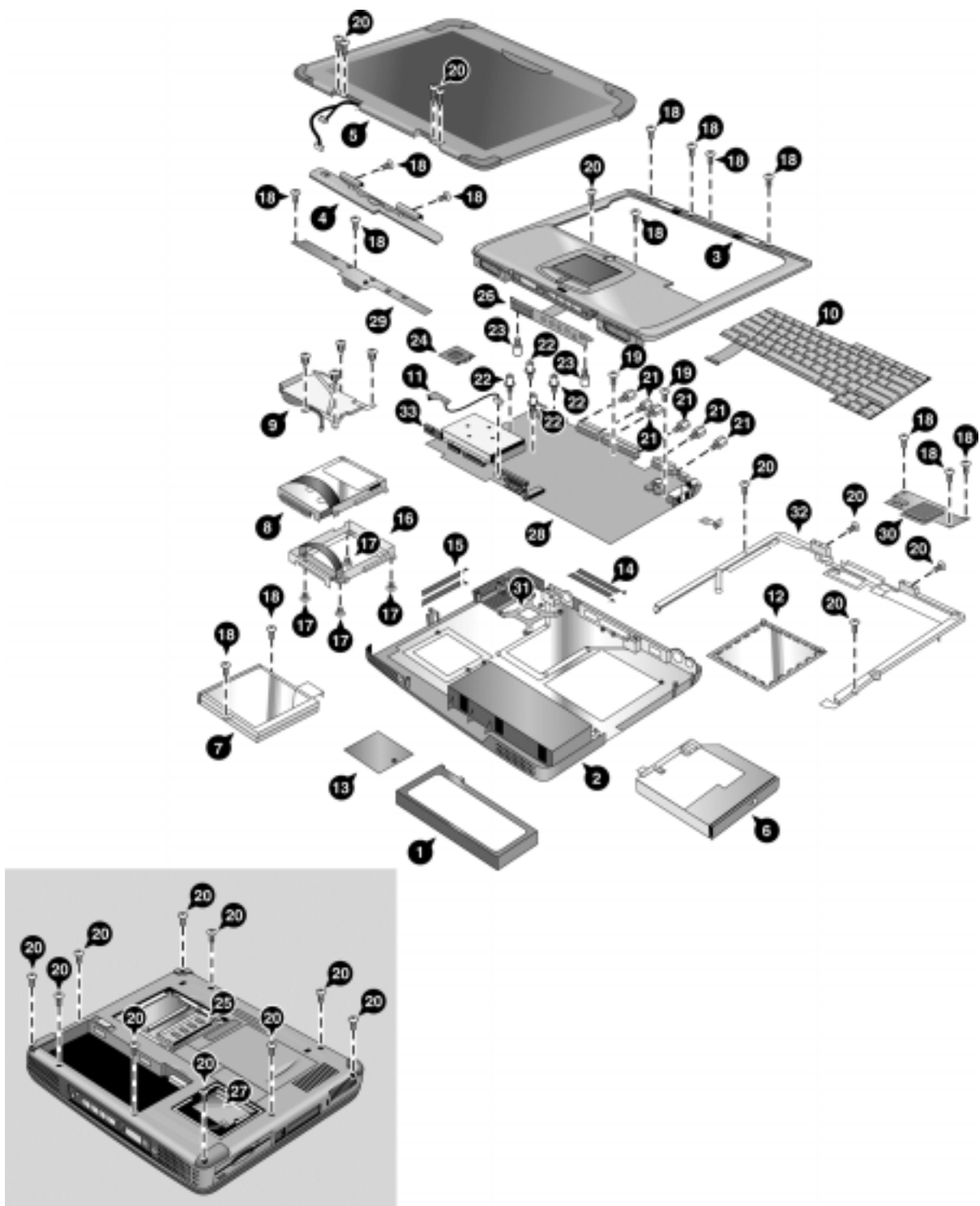


Figure 4-1. Exploded View

Table 4-1. Replaceable Parts

	Description	Part Number	Exchange Part Number	User-Repl.
1	Battery, Lilon (9 cell)	F2111-60901		Yes
2	Case, bottom (modem & modem/LAN)	F2111-60964		No
2	Case, bottom (no modem or LAN)	F2111-60974		No
3	Case, top	F2111-60947		No
4	Cover, keyboard	F2111-60939		Yes
5	Display, 12.1-in TFT	F2111-60905	F2111-69005	No
5	Display, 14.1-in TFT	F2111-60911	F2111-69011	No
5	Display, 15-in TFT	F2111-60913	F2111-69013	No
6	Drive, CD-ROM	F2111-60954		No
6	Drive, DVD	F2111-60955		No
7	Drive, floppy disk	F2111-60953		No
8	Drive, hard disk (10 GB, 9.5 mm, Hitachi)	0950-3903	F2072-69108	Yes
8	Drive, hard disk (10 GB, 9.5 mm, IBM)	0950-3831	F2072-69104	Yes
8	Drive, hard disk (5 GB, 9.5 mm, Hitachi)	0950-3825	F2072-69103	Yes
8	Drive, hard disk (5 GB, 9.5 mm, IBM)	0950-3832	F2072-69105	Yes
9	Heatsink assembly (with fan)	F2111-60950		No
10	Keyboard, Arabic/English	F2111-60938		No
10	Keyboard, Belgian	F2111-60930		No
10	Keyboard, Chinese	F2111-60931		No
10	Keyboard, Czech	F2111-60928		No
10	Keyboard, Danish	F2111-60920		No
10	Keyboard, French	F2111-60917		No
10	Keyboard, French Canadian	F2111-60923		No
10	Keyboard, German	F2111-60925		No
10	Keyboard, Greek	F2111-60929		No
10	Keyboard, Hebrew	F2111-60936		No
10	Keyboard, Hungarian	F2111-60937		No
10	Keyboard, International English	F2111-60926		No
10	Keyboard, Italian	F2111-60918		No
10	Keyboard, Japanese	F2111-60935		No
10	Keyboard, Norwegian	F2111-60921		No
10	Keyboard, Portuguese	F2111-60933		No
10	Keyboard, Russian	F2111-60934		No
10	Keyboard, Spanish	F2111-60919		No
10	Keyboard, Swedish	F2111-60924		No
10	Keyboard, Swiss	F2111-60922		No
10	Keyboard, Turkish	F2111-60927		No
10	Keyboard, U.K. English	F2111-60916		No
10	Keyboard, U.S. English	F2111-60915		No
	Kit, base labels (XE3—includes rating label, safety label, business card holder, barcode overlay)	F2111-60968		No
	Kit, cables (includes modem cable, LAN cable, audio cable, and headphone PCA)	F2111-60973		No
11	PCA, headphone	(see above kit)		

	Description	Part Number	Exchange Part Number	User-Repl.
	Kit, covers	F2111-60943		No
12	Cover, SDRAM	(see above kit)		No
13	Cover, mini-PCI	(see above kit)		No
14	Doors, docking (with springs)	(see above kit)		No
15	Doors, PCMCIA (with springs)	(see above kit)		No
16	Kit, hard disk drive carrier (includes bracket, strap, connector, mounting screws)	F2111-60956		Yes
17	Screw, M3x6 mm	(see above kit)		
	Kit, LCD screw covers (includes covers for all display sizes)	F2111-60914		Yes
	Kit, screws (includes all screws needed to replace all notebook FRUs)	F2111-60972		No
18	Screw, M2.5x4 mm	(see above kit)		No
19	Screw, M2.5x5 mm	(see above kit)		No
20	Screw, M2.5x8 mm	(see above kit)		No
21	Standoff screw, 5 mm	(see above kit)		No
22	Heatsink standoff screw, 5 mm	(see above kit)		No
23	CD player PCA standoff screw, 5 mm	(see above kit)		No
24	Module, CPU (550 MHz, Mobile Celeron)	1821-5865	F2072-69101	No
24	Module, CPU (600 MHz, Mobile Celeron)	1821-5866	F2111-69101	No
24	Module, CPU (650 MHz, Mobile Celeron)	1821-5867	F2111-69102	No
24	Module, CPU (650/500 MHz, Mobile Pentium III)	1821-5689	F1980-69101	No
24	Module, CPU (700/600 MHz, Mobile Pentium III)	1821-5690	F2072-69102	No
25	Module, SDRAM (128 MB, PC100, SODIMM)	1818-7952	F1660-69104	Yes
25	Module, SDRAM (64 MB, PC100, SODIMM)	1818-7951	F1660-69103	Yes
25	Module, SDRAM, (32 MB, PC100, SODIMM)	1818-7950		Yes
25	Module, SDRAM, (32 MB, PC100, SODIMM)	1818-7950		Yes
26	PCA, CD player	F2111-60946		No
27	PCA, mini-PCI (LAN/modem)	F2111-60944		Yes
27	PCA, mini-PCI (modem)	F2111-60945		Yes
28	PCA, motherboard (modem only)	F2111-60975	F2111-69075	No
28	PCA, motherboard (modem/LAN)	F2111-60962	F2111-69062	No
28	PCA, motherboard (modemless)	F2111-60976	F2111-69076	No
29	PCA, switchboard	F2111-60941		No
30	PCA, video	F2111-60957		No
31	Plate, CPU support	F2111-60966		No
32	Set, hinge saddle	F2111-60948		No
	Set, thermal pad	F2111-60952		No
33	Socket, PCMCIA (2-slot)	F2111-60960		No

Table 4-2. Accessory Replaceable Parts

Description	Part Number	Exchange Part Number	User Repl.
AC adapter (60-watt) (F1454A)	0950-3634		Yes
Adapter, PS/2 "Y" (F1469A)	F1469-80001		Yes
Auto/airline AC adapter (75-watt) (F1455A)	5182-5131		Yes
Battery, Lilon (9 cell) (F2024A)	F2111-60901		Yes
Power cord, replacement (Australia)	8120-6312		Yes
Power cord, replacement (U.S., Canada, Taiwan)	8120-6313		Yes
Power cord, replacement (Europe)	8120-6314		Yes
Power cord, replacement (Japan)	8120-6316		Yes
Power cord, replacement (India, S. Africa)	8120-6317		Yes
Power cord, replacement (Argentina)	8120-8367		Yes
Power cord, replacement (People's Rep. Of China)	8120-8373		Yes
Power cord, replacement (Chile)	8120-8452		Yes
Power cord, replacement (Hong Kong, Singapore, U.K.)	8120-8699		Yes
SDRAM module, 128-MB, PC-100 SODIMM	1818-7952	F1660-69104	Yes
SDRAM module, 32-MB, PC-100 SODIMM	1818-7950		Yes
SDRAM module, 64-MB, PC-100 SODIMM	1818-7951	F1660-69103	Yes
Simple port replicator (F2025A)	F2111-60967		Yes
Ultra Slimline AC adapter (60-watt) (F1781A)	0950-3765		Yes

Table 4-3. Part Number Reference

Part Number	Exchange Part Number	Description	User Repl.
0950-3634		Adapter, AC (60 watt)	Yes
0950-3765		Adapter, AC, Ultra Slimline (60 watt)	Yes
0950-3825	F2072-69103	Drive, hard disk (5 GB, 9.5 mm, Hitachi)	Yes
0950-3831	F2072-69104	Drive, hard disk (10 GB, 9.5 mm, IBM)	Yes
0950-3832	F2072-69105	Drive, hard disk (5 GB, 9.5 mm, IBM)	Yes
0950-3903	F2072-69108	Drive, hard disk (10 GB, 9.5 mm, Hitachi)	Yes
1818-7950		Module, SDRAM, (32 MB, PC100, SODIMM)	Yes
1818-7950		Module, SDRAM, (32 MB, PC100, SODIMM)	Yes
1818-7951	F1660-69103	Module, SDRAM (64 MB, PC100, SODIMM)	Yes
1818-7952	F1660-69104	Module, SDRAM (128 MB, PC100, SODIMM)	Yes
1821-5689	F1980-69101	Module, CPU (650/500 MHz, Mobile Pentium III)	No
1821-5690	F2072-69102	Module, CPU (700/600 MHz, Mobile Pentium III)	No
1821-5865	F2072-69101	Module, CPU (550 MHz, Mobile Celeron)	No
1821-5866	F2111-69101	Module, CPU (600 MHz Mobile Celeron)	No
1821-5867	F2111-69102	Module, CPU (650 MHz Mobile Celeron)	No
5182-5131		Adapter, auto/airline (75 watt)	Yes
8120-6312		Replacement power cord (Australia)	Yes
8120-6313		Replacement power cord, (U.S., Canada, Taiwan)	Yes
8120-6314		Replacement power cord (Europe)	Yes
8120-6316		Replacement power cord (Japan)	Yes
8120-6317		Replacement power cord (India, S. Africa)	Yes
8120-8367		Replacement power cord (Argentina)	Yes
8120-8373		Replacement power cord (People's Rep. Of China)	Yes
8120-8452		Replacement power cord (Chile)	Yes
8120-8699		Replacement power cord (Hong Kong, Singapore, U.K.)	Yes
F1469-80001		Adapter, PS/2 "Y"	Yes
F2111-60901		Battery, Lilon	Yes
F2111-60905	F2111-69005	Display assembly, 12.1-in TFT	No
F2111-60911	F2111-69011	Display assembly, 14.1-in TFT	No
F2111-60913	F2111-69013	Display assembly, 15-in TFT	No
F2111-60914		Kit, LCD screw covers (includes covers for all display sizes)	Yes
F2111-60915		Keyboard, U.S. English	No
F2111-60916		Keyboard, U.K. English	No
F2111-60917		Keyboard, French	No
F2111-60918		Keyboard, Italian	No
F2111-60919		Keyboard, Spanish	No
F2111-60920		Keyboard, Danish	No
F2111-60921		Keyboard, Norwegian	No
F2111-60922		Keyboard, Swiss	No
F2111-60923		Keyboard, French Canadian	No
F2111-60924		Keyboard, Swedish	No
F2111-60925		Keyboard, German	No
F2111-60926		Keyboard, International English	No
F2111-60927		Keyboard, Turkish	No

Part Number	Exchange Part Number	Description	User Repl.
F2111-60928		Keyboard, Czech	No
F2111-60929		Keyboard, Greek	No
F2111-60930		Keyboard, Belgian	No
F2111-60931		Keyboard, Chinese	No
F2111-60932		Keyboard, Polish	No
F2111-60933		Keyboard, Portuguese	No
F2111-60934		Keyboard, Russian	No
F2111-60935		Keyboard, Japanese	No
F2111-60936		Keyboard, Hebrew	No
F2111-60937		Keyboard, Hungarian	No
F2111-60938		Keyboard, Arabic/English	No
F2111-60939		Cover, keyboard	Yes
F2111-60941		PCA, switchboard	No
F2111-60943		Kit, covers (includes SDRAM cover, mini-PCI cover, docking doors (with springs), PCMCIA doors (with springs))	No
F2111-60944		PCA, mini-PCI (LAN/modem)	Yes
F2111-60945		PCA, mini-PCI (modem)	Yes
F2111-60946		PCA, CD player	No
F2111-60947		Case, top	No
F2111-60948		Set, hinge saddle	No
F2111-60950		Heatsink assembly (with fan)	No
F2111-60952		Set, thermal pad (Intel)	No
F2111-60953		Drive, floppy disk assembly	No
F2111-60954		Drive, CD-ROM assembly	No
F2111-60955		Drive, DVD assembly	No
F2111-60956		Kit, hard disk drive carrier (includes bracket, strap, connector, mounting screws)	Yes
F2111-60957		PCA, video (S3)	No
F2111-60960		Socket, PCMCIA (2-slot)	No
F2111-60962	F2111-69062	PCA, motherboard (modem/LAN)	No
F2111-60964		Case, bottom (modem & modem/LAN)	No
F2111-60966		Plate, CPU support	No
F2111-60967		Port replicator assembly, simple	No
F2111-60968		Kit, base labels (includes rating label, safety label, business card holder, barcode overlay)	No
F2111-60972		Kit, screws (includes all screws needed to replace all notebook FRUs)	No
F2111-60973		Kit, cables (includes modem cable, LAN cable, audio cable, and connector PCA)	No
F2111-60974		Case, bottom (no modem or LAN)	No
F2111-60975	F2111-69075	PCA, motherboard (modem only)	No
F2111-60976	F2111-69076	PCA, motherboard (modemless)	No
F2113-60901		Recovery CD, U.S. English W98	No
F2113-60902		Recovery CD, French W98	No
F2113-60903		Recovery CD, Italian W98	No
F2113-60904		Recovery CD, German W98	No
F2113-60905		Recovery CD, Spanish W98	No

Part Number	Exchange Part Number	Description	User Repl.
F2113-60906		Recovery CD, International English W98	No
F2113-60907		Recovery CD, Swedish/English W98	No
F2113-60908		Recovery CD, Norwegian/English W98	No
F2113-60909		Recovery CD, Danish/English W98	No
F2113-60910		Recovery CD, W98 Finnish/English	No
F2113-60911		Recovery CD, Turkish W98	No
F2113-60912		Recovery CD, Greek/English W98	No
F2113-60913		Recovery CD, Czech W98	No
F2113-60914		Recovery CD, Simplified Chinese W98	No
F2113-60915		Recovery CD, Traditional Chinese W98	No
F2113-60916		Recovery CD, Japanese W98	No
F2113-60917		Recovery CD, Dutch W98	No
F2113-60918		Recovery CD, Hungarian W98	No
F2113-60919		Recovery CD, Hebrew W98	No
F2113-60920		Recovery CD, Arabic/English W98	No
F2113-60921		Recovery CD, Russian W98	No
F2113-60922		Recovery CD, French/German W98	No
F2113-60923		Recovery CD, Polish W98	No
F2113-60925		Recovery CD, International English W2K	No
F2113-60926		Recovery CD, U.S. English W2K	No
F2113-60927		Recovery CD, French W2K	No
F2113-60928		Recovery CD, German W2K	No
F2113-60930		Recovery CD, Swedish W2K	No
F2113-60937		Recovery CD, Japanese W2K	No

Reference Information

This chapter includes the following reference information:

- Password removal policy.
- Display quality statement.

Password Removal Policy

If the user forgets the system password, the user calls Technical Support to determine the proper removal procedure. The user must provide proof of ownership, and the notebook must be operated during the procedure.

The password removal procedure is protected as HP Company Private information. There are a restricted number of locations that can perform password removal. It may not be disclosed or distributed outside those locations.

Password removal is strictly controlled. Hewlett-Packard and authorized support providers must ensure with written evidence that the notebook being “cleansed” is actually in the possession of the notebook’s actual and current owner. This requires a sales receipt showing the notebook serial number and owner’s name, or a written statement from the owner attesting that he or she is the owner of the notebook. The statement can be a fax copy of the document. The fact that the notebook is in the hands of an HP representative on behalf of the customer is not evidence of ownership. In addition, HP will not remove the password of a notebook for any non-owner, even if it is requested by law enforcement agencies. If you receive such a request, you should notify management and HP Corporate Legal immediately. (These requests may require a court order prior to our participation.)

Further, the entity removing the password must log the name, serial number and date of the removal, and file the written backup with the log. The log and backup are subject to standard record retention process and review.

The final issue relating to removal of passwords is that HP cannot provide information to users that would assist them in improperly removing a password and opening a notebook.

Hewlett-Packard Display Quality Statement

TFT display manufacturing is a highly precise but imperfect technology, and manufacturers cannot produce large displays that are cosmetically perfect. Most, if not all, TFT displays exhibit some level of cosmetic imperfection. These cosmetic imperfections may be visible to the customer under varying display conditions, and can appear as bright, dim, or dark spots. *This issue is common across all vendors supplying TFT displays in their products and is not specific to the HP notebook display.*

HP notebook TFT displays meet or exceed all HP standards for cosmetic quality of TFT displays. HP does not warrant that the displays will be free of cosmetic imperfections. *TFT displays can have a small number of cosmetic imperfections and still conform to HP's cosmetic quality specifications.*

Here are some guidelines for determining what action to take on customers' complaints of cosmetic imperfections in their TFT displays:

1. View the notebook under the customer's normal operating conditions.

This means that if the customer uses the notebook predominately in DOS, in Windows, or in some other application or combination of applications, you should make the determination under those same applications. Self test is not a normal operating condition and is not a sufficient tool for interpreting display quality.

2. Use the table below to determine whether the display should be considered for replacement. These are the only conditions in this guideline that may call for a replacement due to a defect in material or workmanship based on the HP Limited Warranty Statement.
3. If a display is considered for replacement, make sure the customer understands that cosmetic variations may also exist on the replacement display, and may require the customer to use a work-around to obscure the cosmetic imperfection.
4. Customers with cosmetic-based complaints that do not conform to the above conditions and tests will not normally be considered for display replacement. The HP-responsible person working with the customer should identify work-arounds that are reasonable and appropriate for the individual customer. Customers who must have a more perfect display solution should consider switching to a notebook with a DSTN display.

We expect that over time the industry will continue to produce displays with fewer inherent cosmetic imperfections, and we will adjust our HP guidelines as these improvements are implemented.

Table 5-1. XE3 TFT LCD Guidelines (12.1-in SVGA, 13.3/14.1/15.0-in XGA)

Type of Imperfection	Imperfections Not Allowed
Electrical Imperfections: Bright dots (a) Dark dots (a)	<ul style="list-style-type: none"> • 7 or more single bright dots. • 7 or more single dark dots. • 9 or more total (bright and dark combined) defective dots. • Any occurrence of multiple defective dots within 15 mm.
Mechanical Imperfections: Discoloration Polarizer bubbles, dents (b)	<ul style="list-style-type: none"> • Any polarizer bubble, discoloration, or dent that is visible from at least 36 cm (14 in).
Definitions of imperfections: a Bright or dark dot: a subpixel (red, green, or blue dot) that is stuck on or off. b Polarizer dent or bubble: a light spot with a darker border that appears on a lighted display and does not change size. (In contrast, a polarizer scratch is a light line that is visible on a darker background and does not change size.)	

Service Notes

Service notes containing important repair information for the notebook will be issued periodically as needed. These notes are available online at the Partnership Web site—see page vii.

- 1. Product Information**
- 2. Removal and Replacement**
- 3. Troubleshooting and Diagnostics**
- 4. Replaceable Parts**
- 5. Reference Information**

English
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