



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.

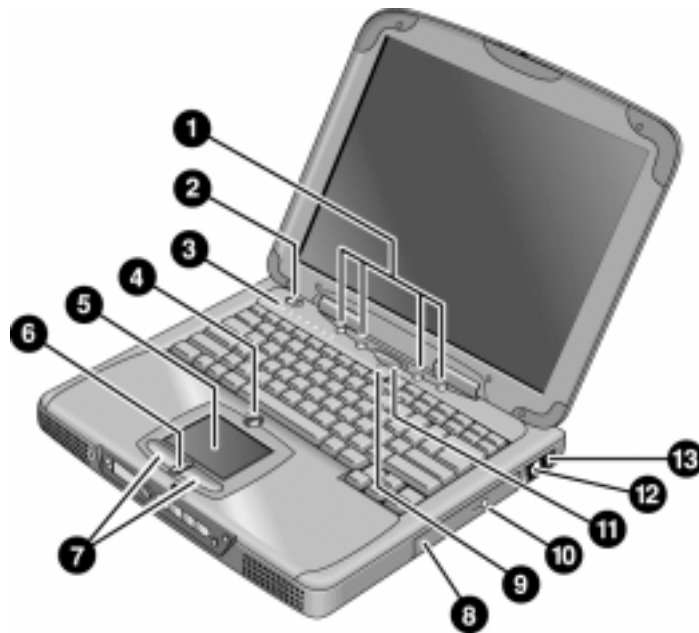


Figure 1-1. Top/Right View

- | | |
|---|--|
| 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). |

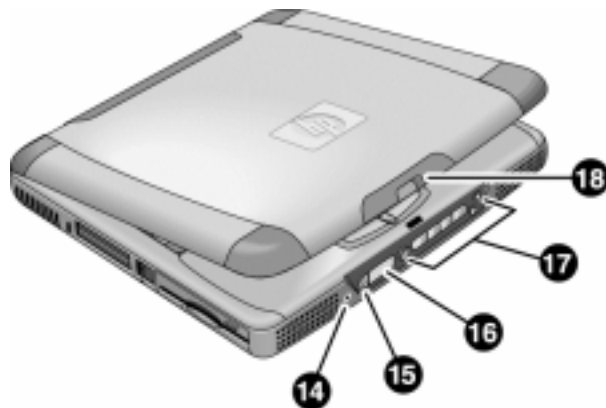


Figure 1-2. Front View

- | | |
|--------------------------------------|------------------------------|
| 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. |

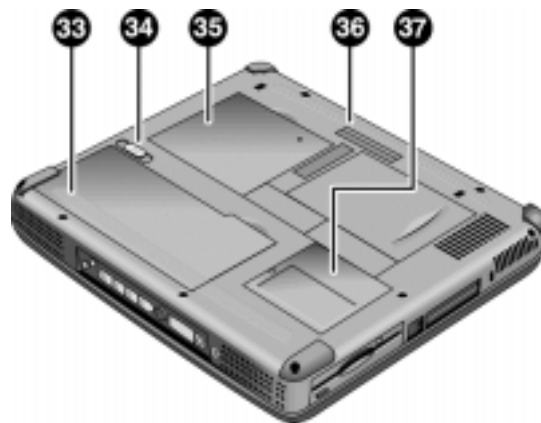


Figure 1-4. Bottom View

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.

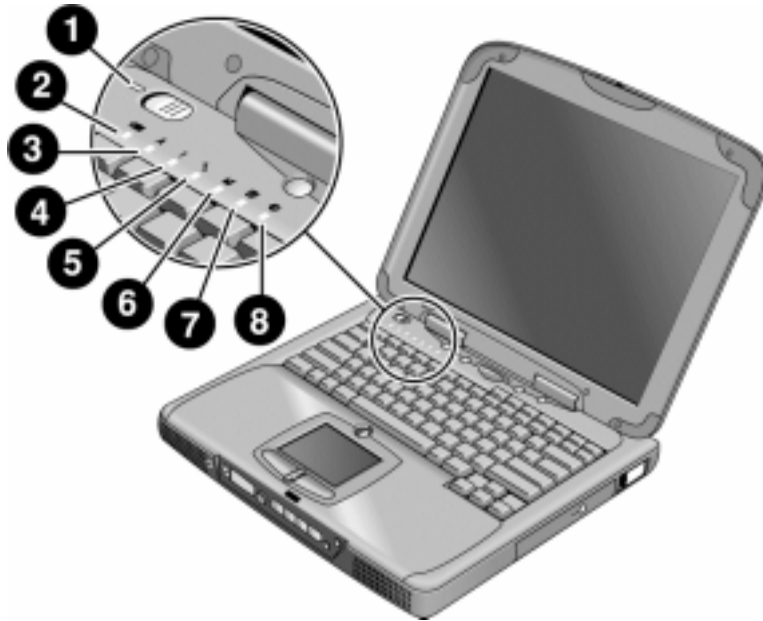


Figure 1-5. Status Lights

- | | |
|--------------------|----------------------------------|
| 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.

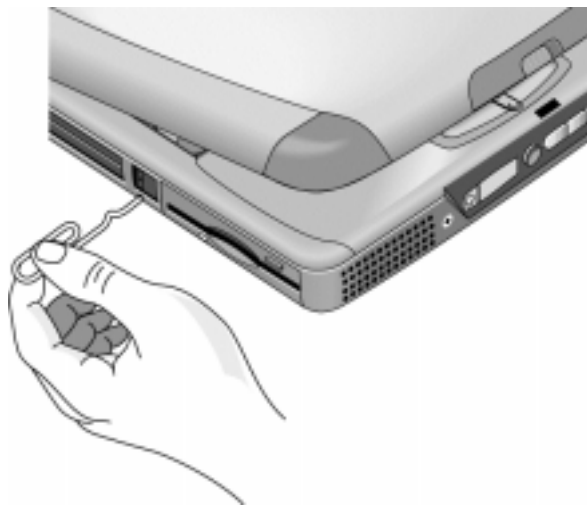


Figure 1-6. Resetting the Notebook

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*.

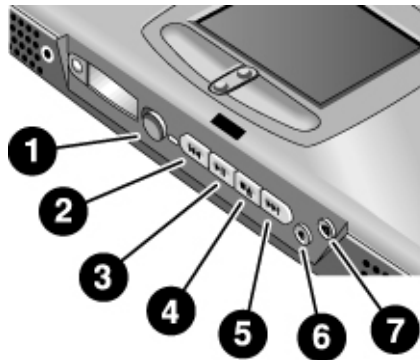


Figure 1-7. Multimedia Buttons

- | | |
|---|--------------------------------|
| 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 × 272.3 × 40.5 mm (13.03 × 10.72 × 1.59 in). 15/13-in display: 331 × 272.3 × 42.0 mm (13.03 × 10.72 × 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: – 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: – 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: – 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	Keyboard: – 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. Pointing device: touch pad with on/off and scroll up/down buttons.
Audio System	ESS Allegro (1988): – Integrated AC'97 CODEC. – HSP modem interface via MC'97 link. – Support wake-up on ring. Modem CODEC ESS 2828 on mini-PCI slot. Stereo sound via two built-in speakers. Built-in microphone. Microphone and headphone jacks.
CD Player	OZ-163 controller. CD can play while notebook is off.
Communications	LAN: – 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. Modem: – 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	Super I/O controller: SMC 869. Serial port: 9-pin (RS232), 115,200-bps (16550 UART). Parallel port: 25-pin, bi-directional, high-speed, with ECP/EPP capability. PS/2 port: 6-pin keyboard/keypad/mouse port (Y adapter compatible). VGA video out: 15-pin, with hot plug/unplug CRT-detect. (Resolution from 640 × 480 up to 1024 × 768, depending on available SDRAM.) Two universal serial bus (USB) ports. One IrDA-compliant fast infrared (FIR) port. Docking port for simple port replicator. DC-in jack. Composite TV out: supports LCD, CRT, LCD/CRT, LCD/TV.
PCMCIA	TI 1420: two slots – 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	32/64/128 MB PC-100 SODIMM: 3.3V, 144-pin, SDRAM. Simple port replicator. Mini-PCI modem, supporting wake-up on Ring# from D3 (cold) with AC-in. Mini-PCI modem/LAN combo, supporting wake-up on Ring# & PME# from D3 (cold) with AC-in.

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.

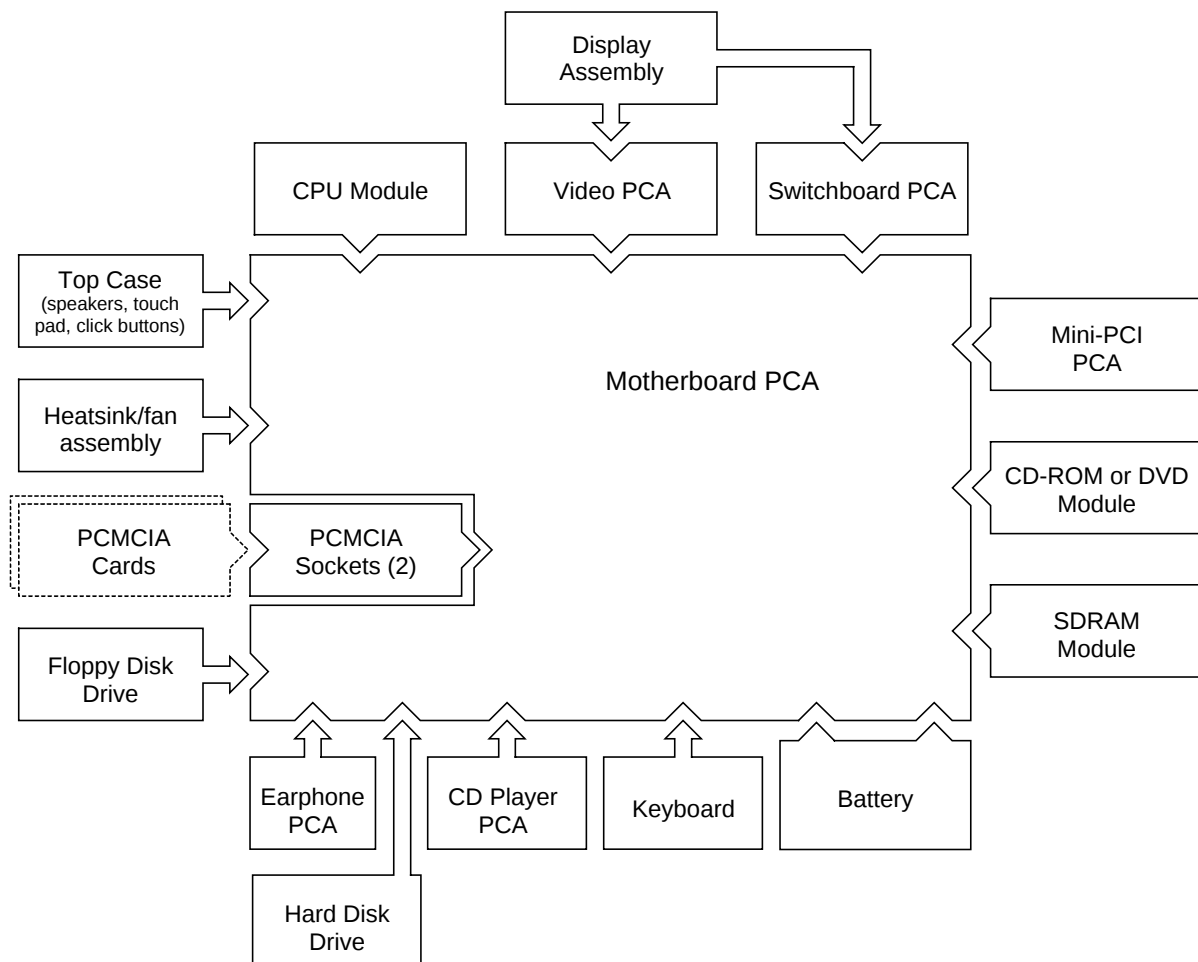


Figure 1-8. Replaceable Module Diagram

Table 1-1. Functional Structure

Function	Components Used	Component Roles
Startup	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

• 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).	- 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.

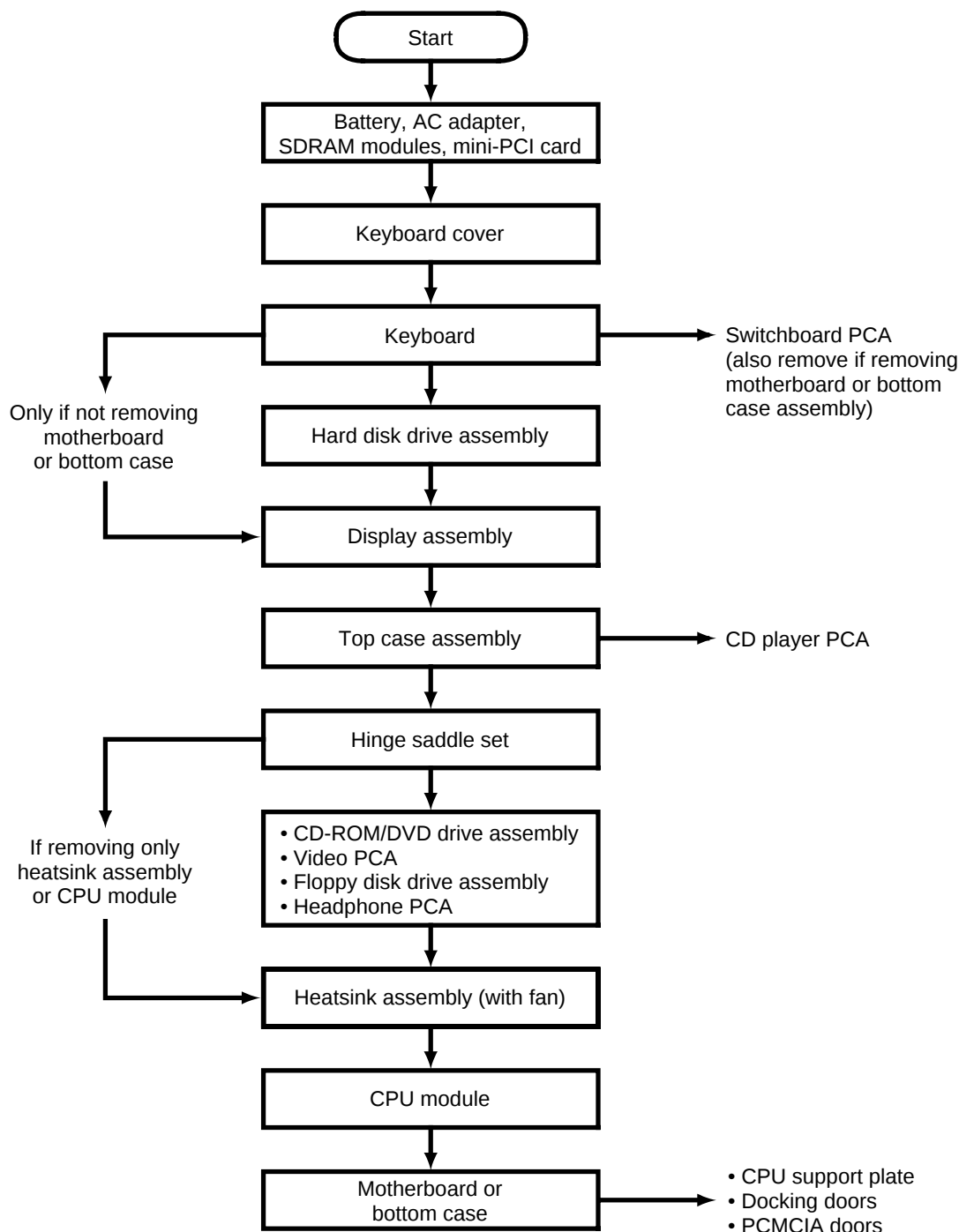


Figure 2-1. Disassembly Flow

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.

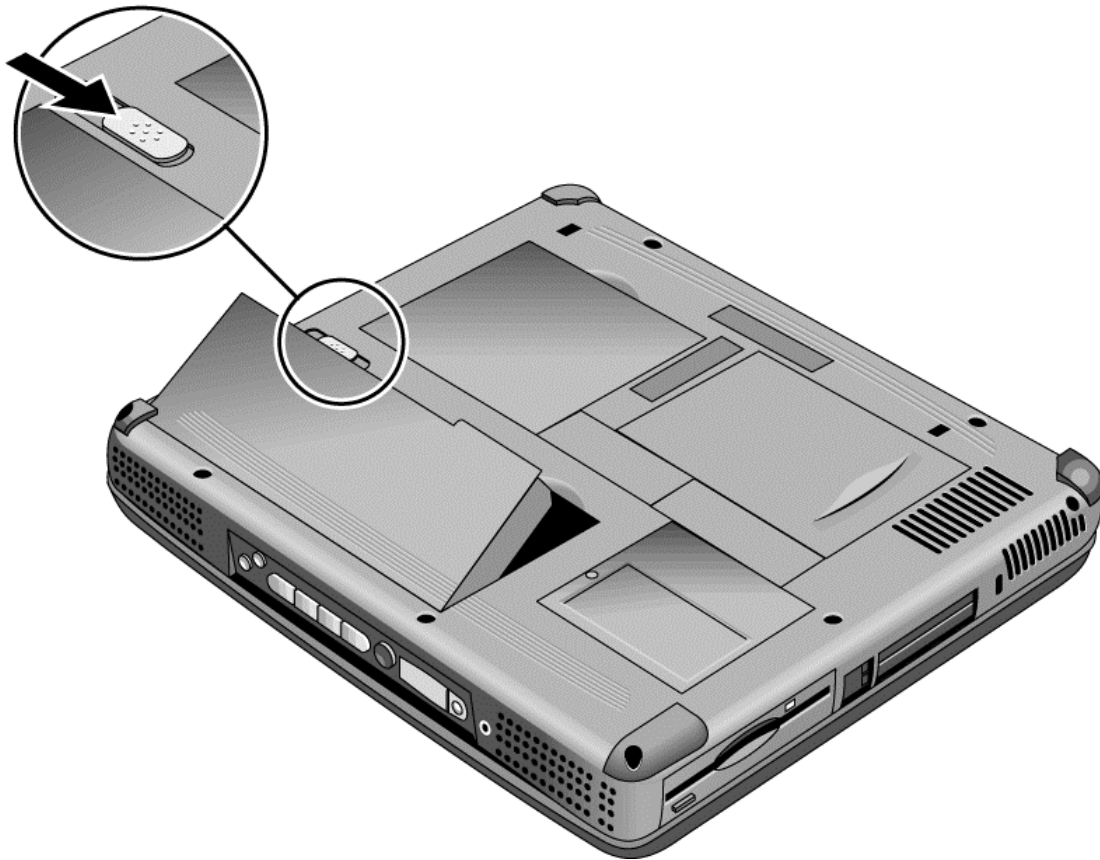


Figure 2-2. Removing the Battery

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.

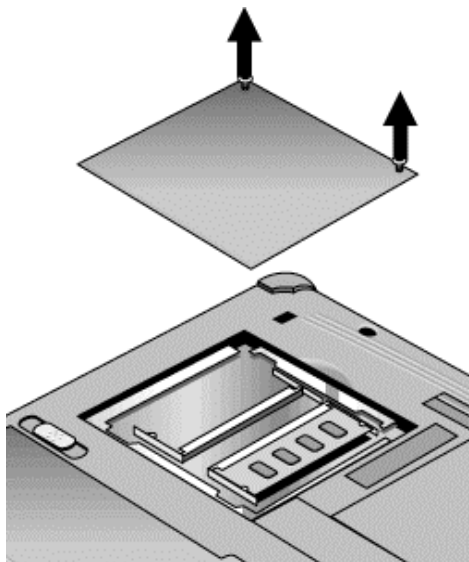


Figure 2-3. Removing the SDRAM Cover

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

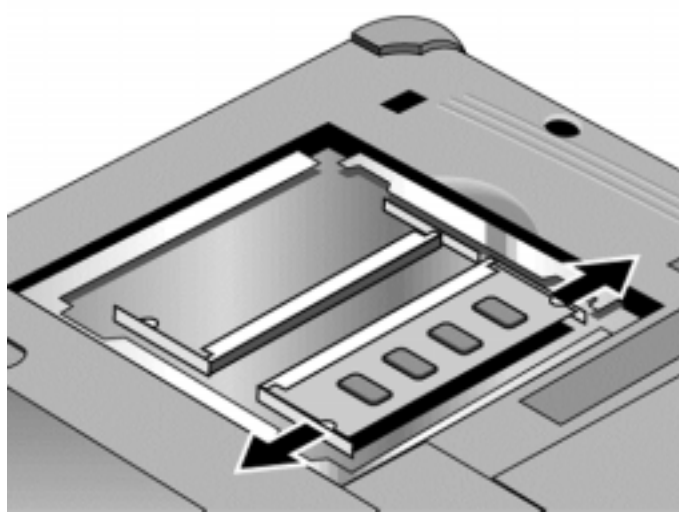


Figure 2-4. Removing an SDRAM Module

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.

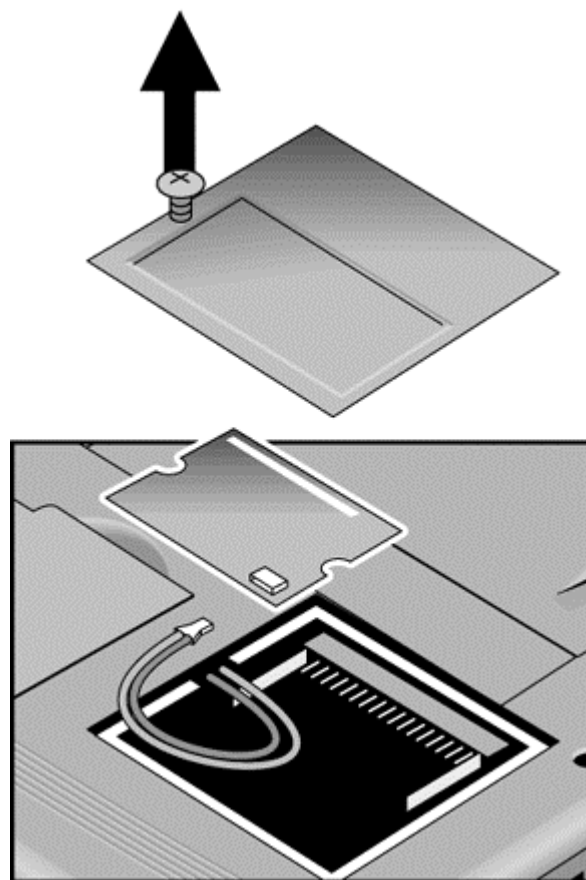


Figure 2-5. Removing the Mini-PCI Card

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.

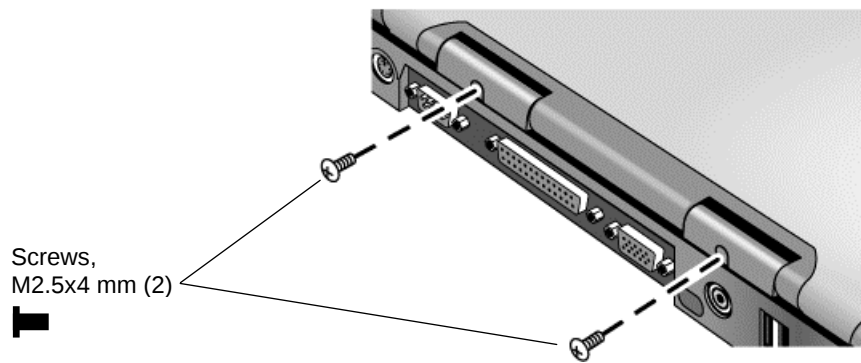


Figure 2-6. Removing the Keyboard Cover Retaining Screws

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).

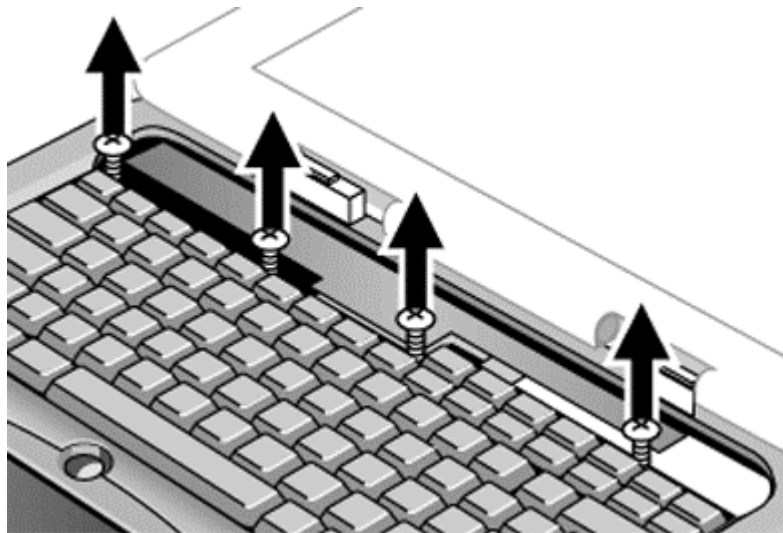


Figure 2-8. Loosening the Keyboard Retaining Screws

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.

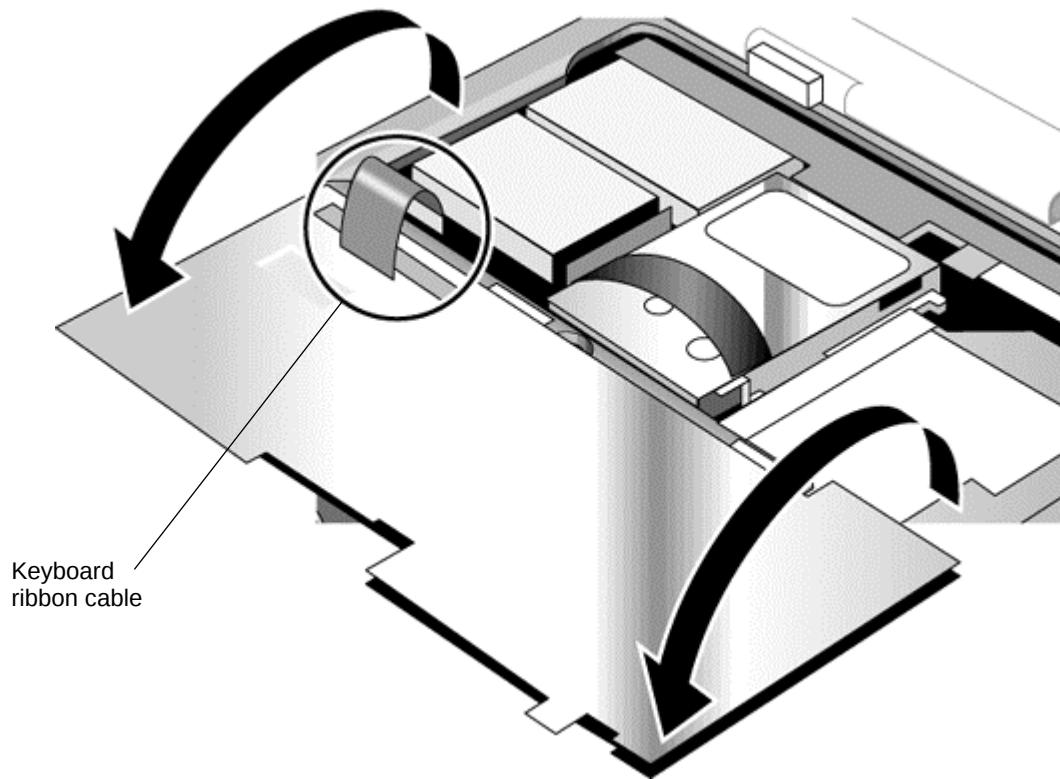


Figure 2-9. Disconnecting the Keyboard Cable

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.

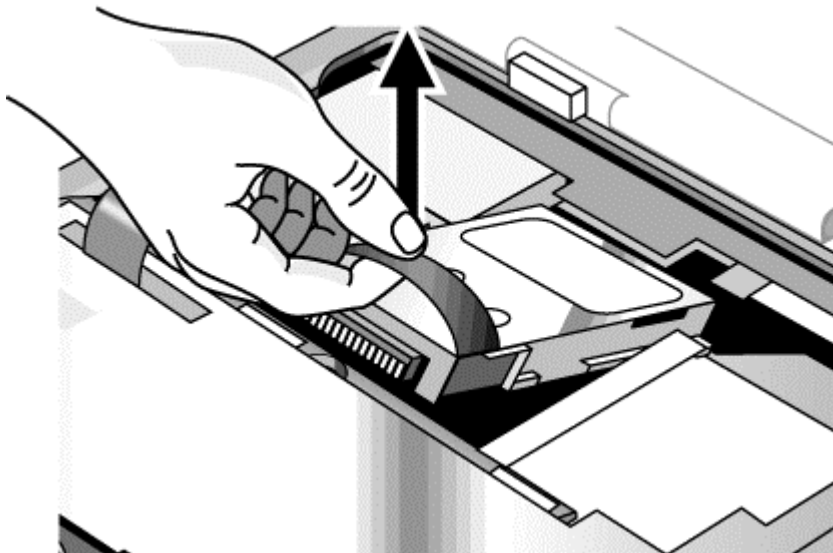


Figure 2-10. Removing the Hard Disk Drive

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

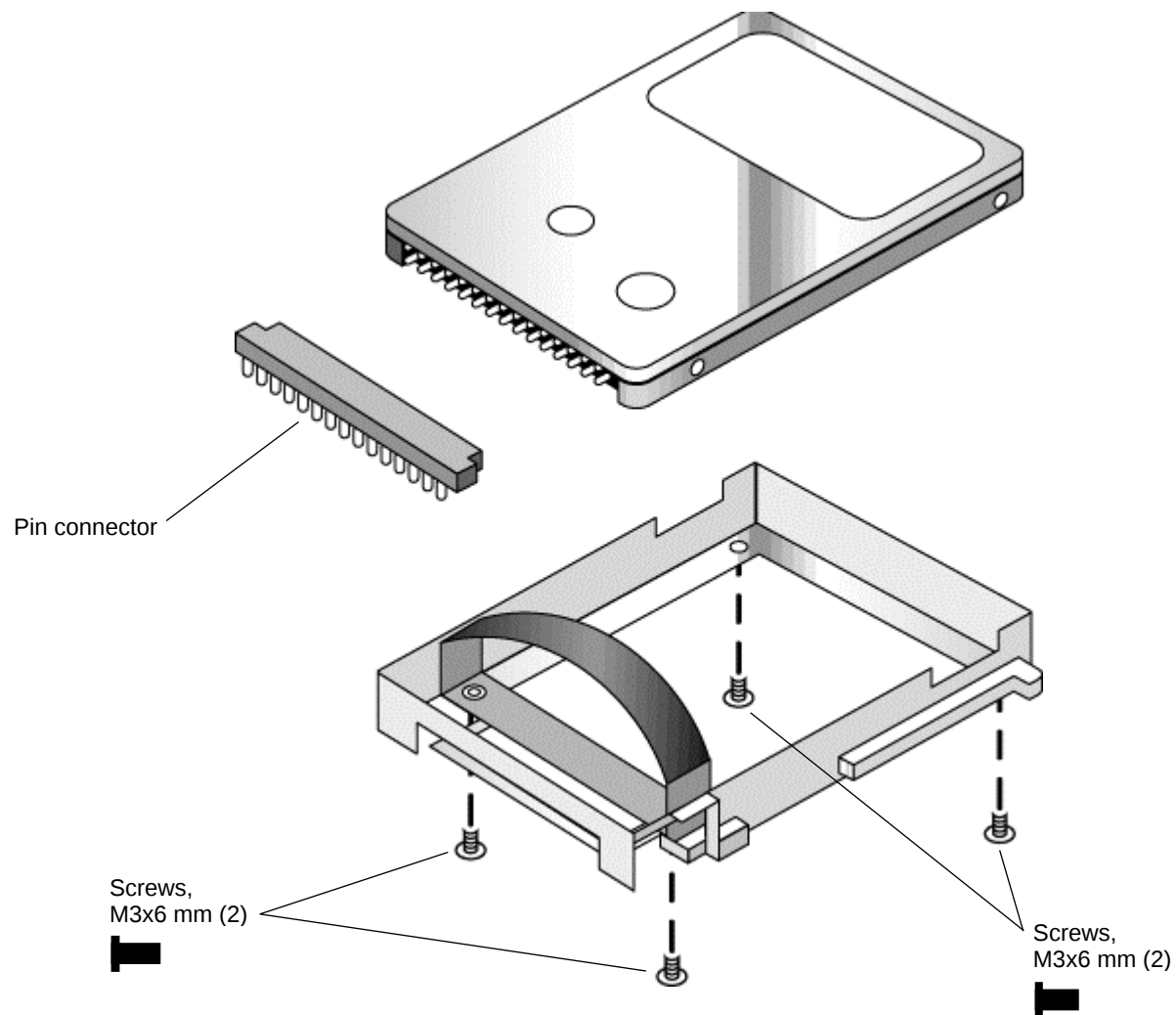


Figure 2-11. Removing the Hard Disk Carrier

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.

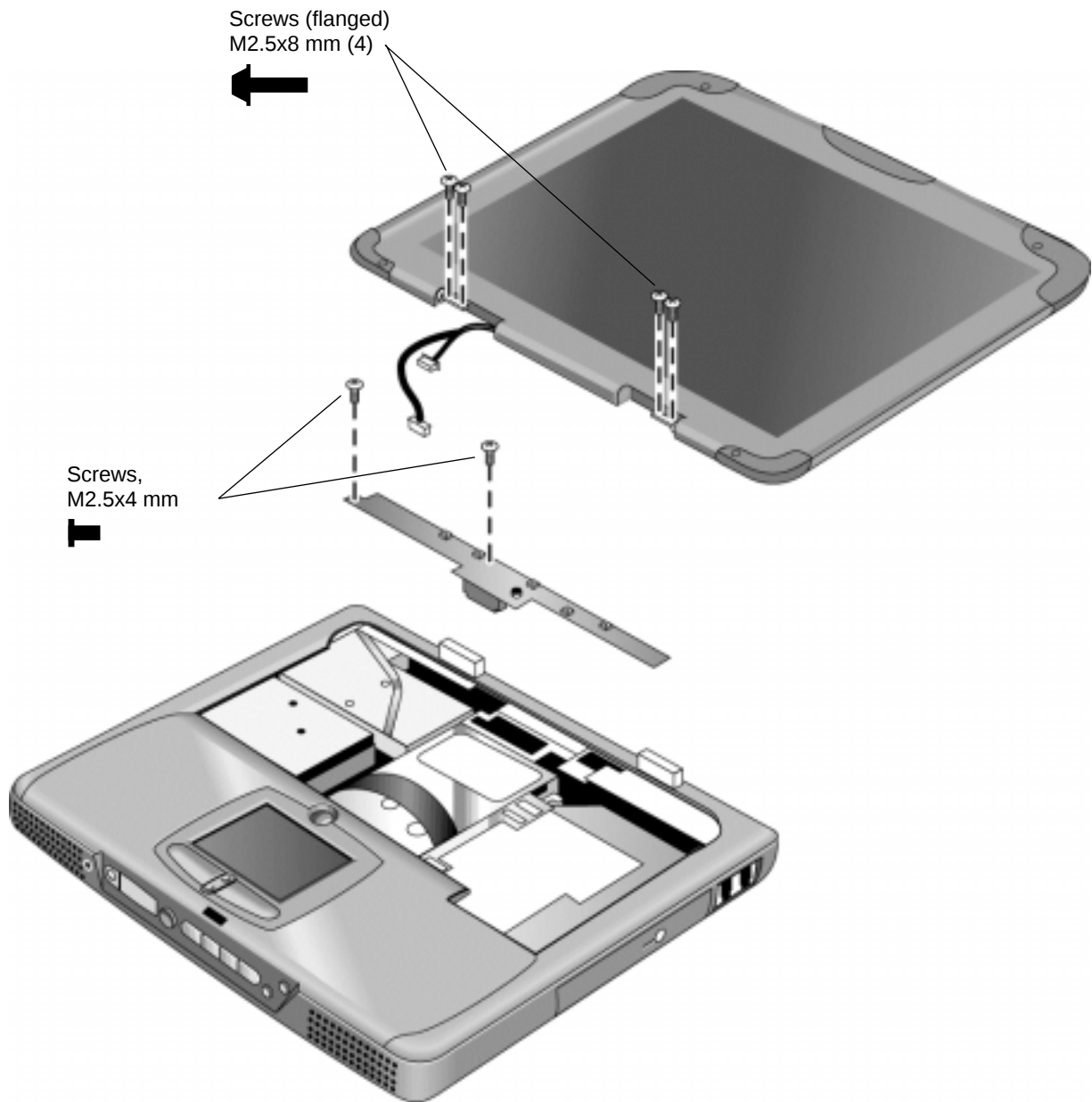


Figure 2-12. Removing the Display

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:

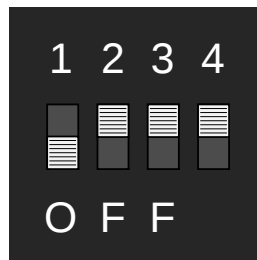


Figure 2-13. Video PCA DIP Switches

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.

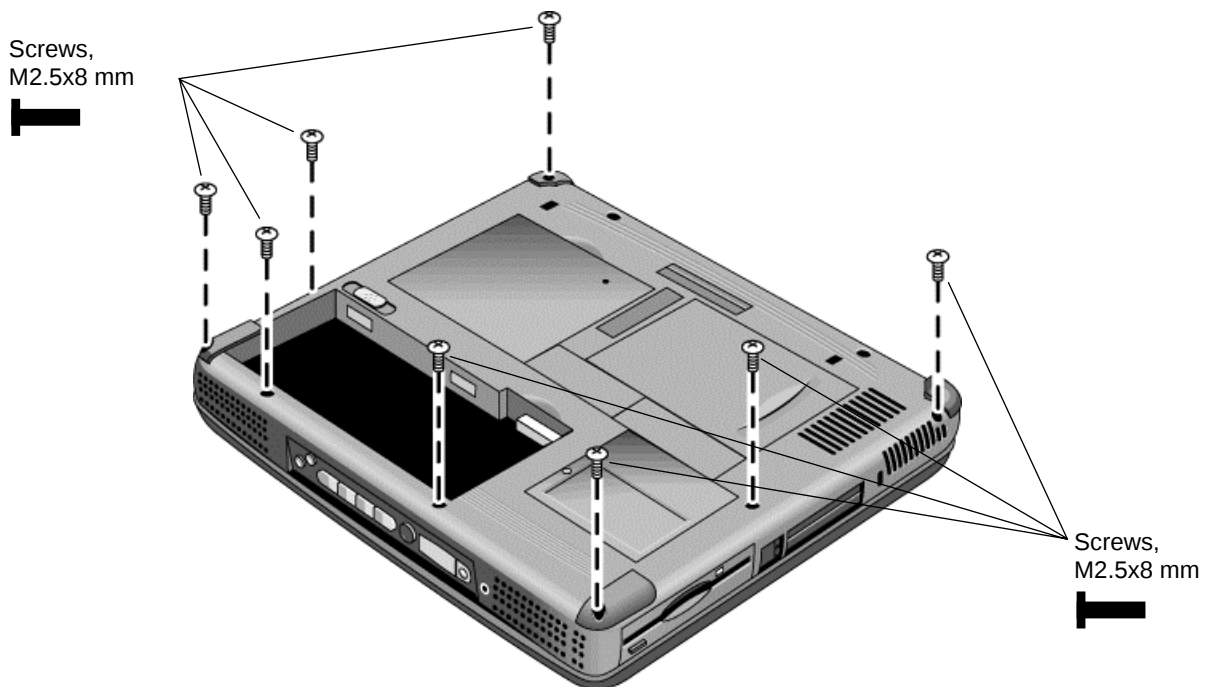


Figure 2-14. Removing the Top Case Retaining Screws

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.

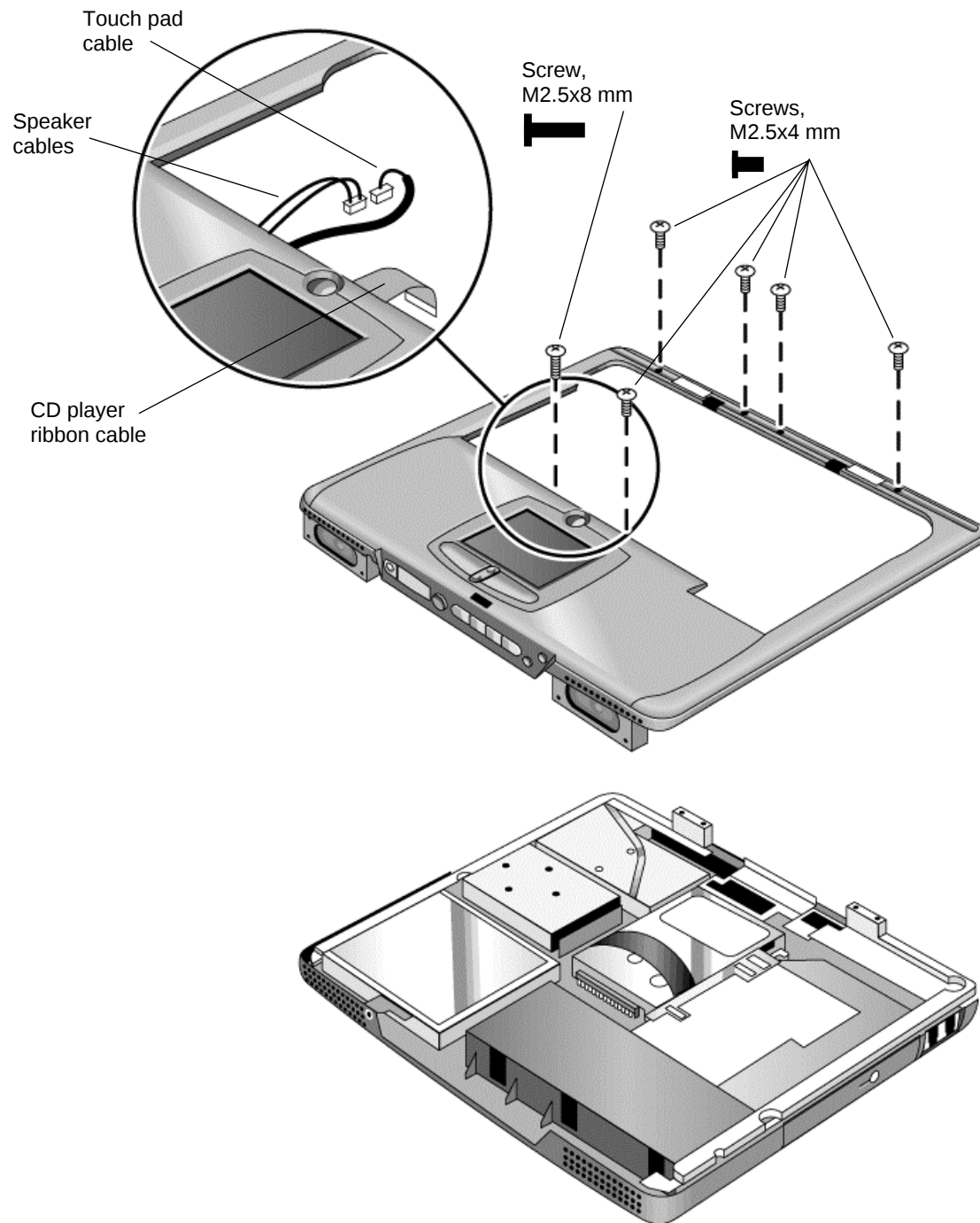


Figure 2-15. Removing the Top Case

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.

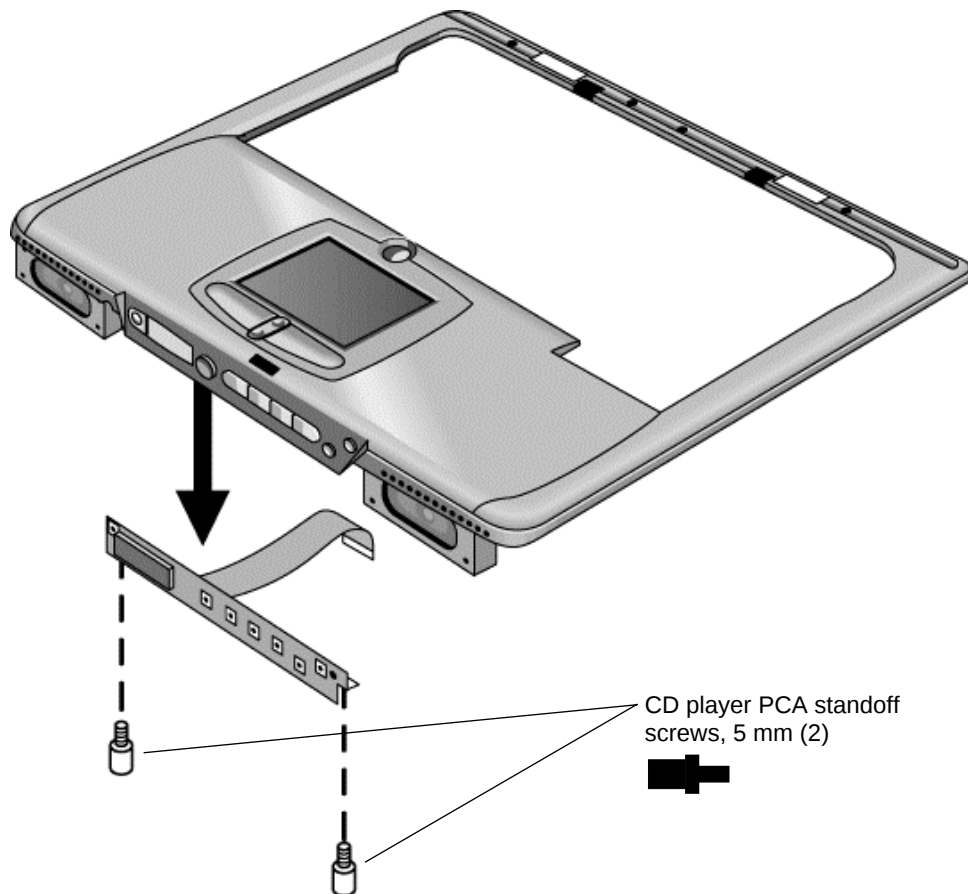


Figure 2-16. Removing the CD Player PCA

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.

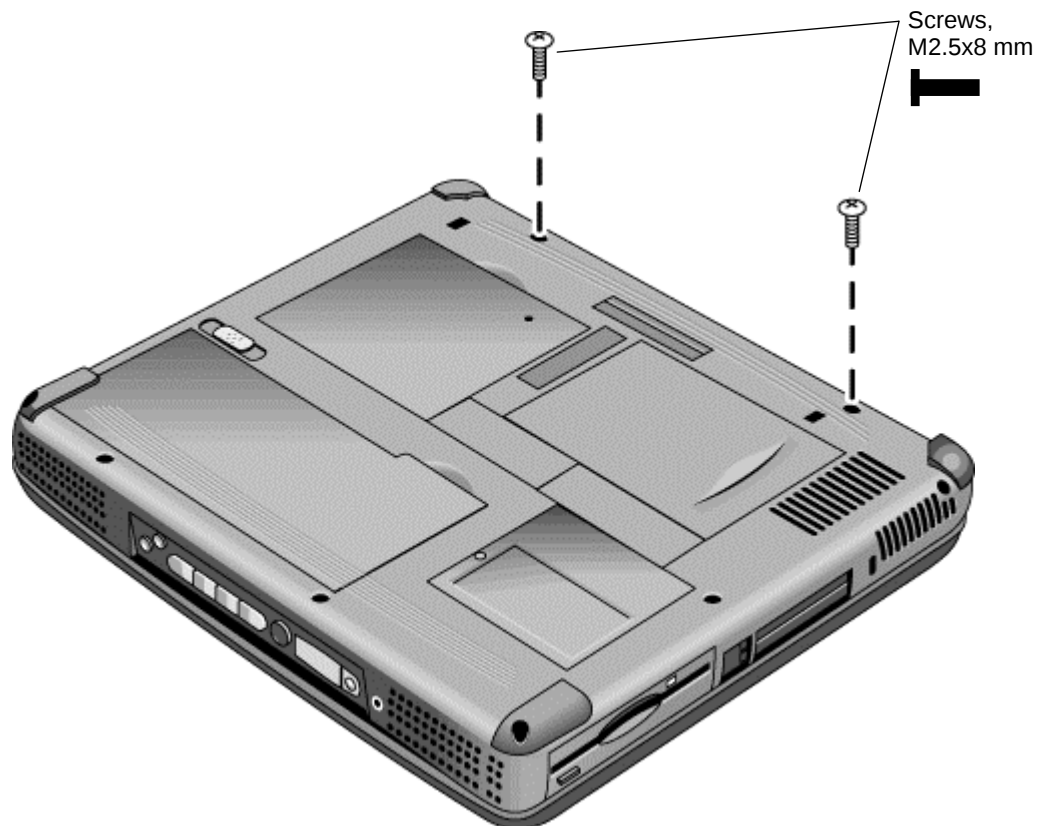


Figure 2-17. Removing the Hinge Saddle Retaining Screws

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.

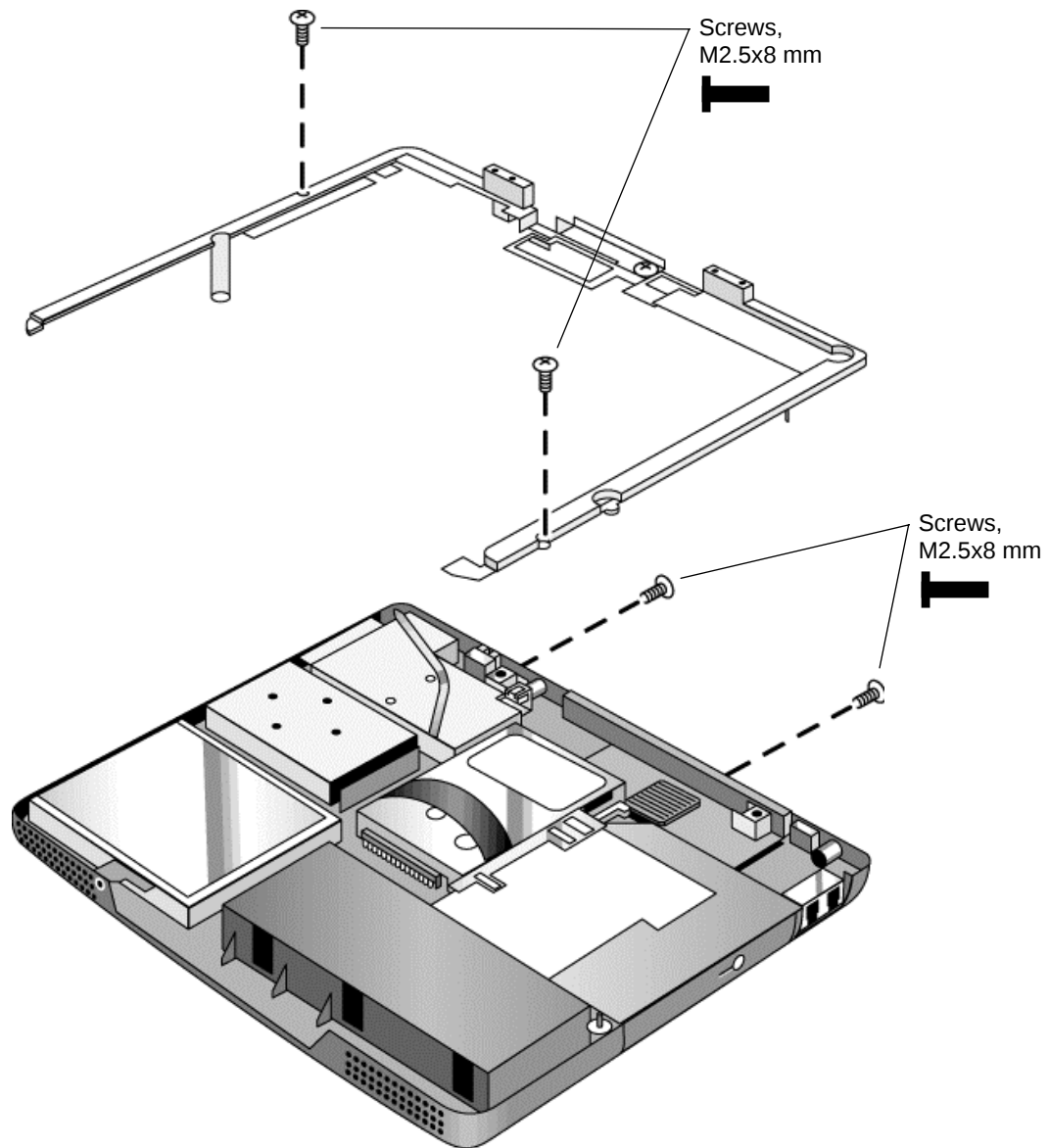


Figure 2-18. Removing the Hinge Saddle

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.

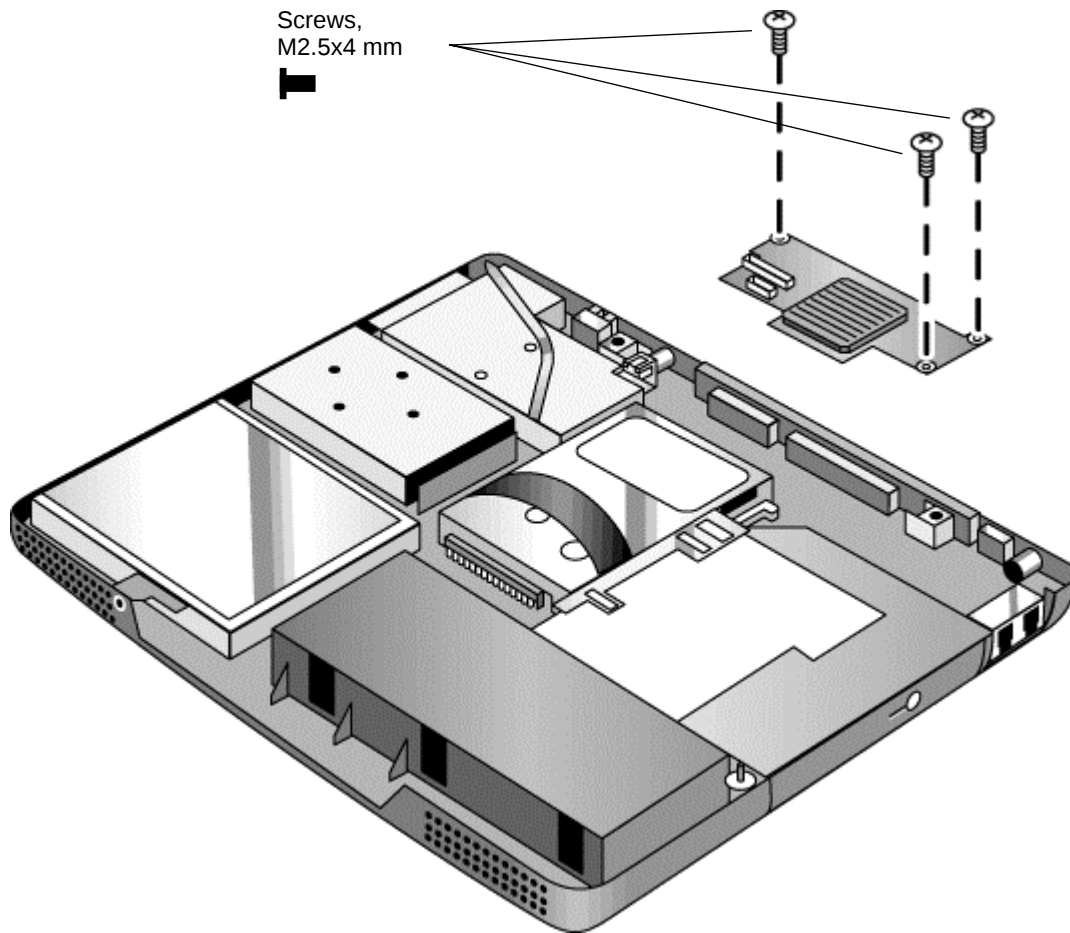


Figure 2-19. Removing the Video PCA

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.

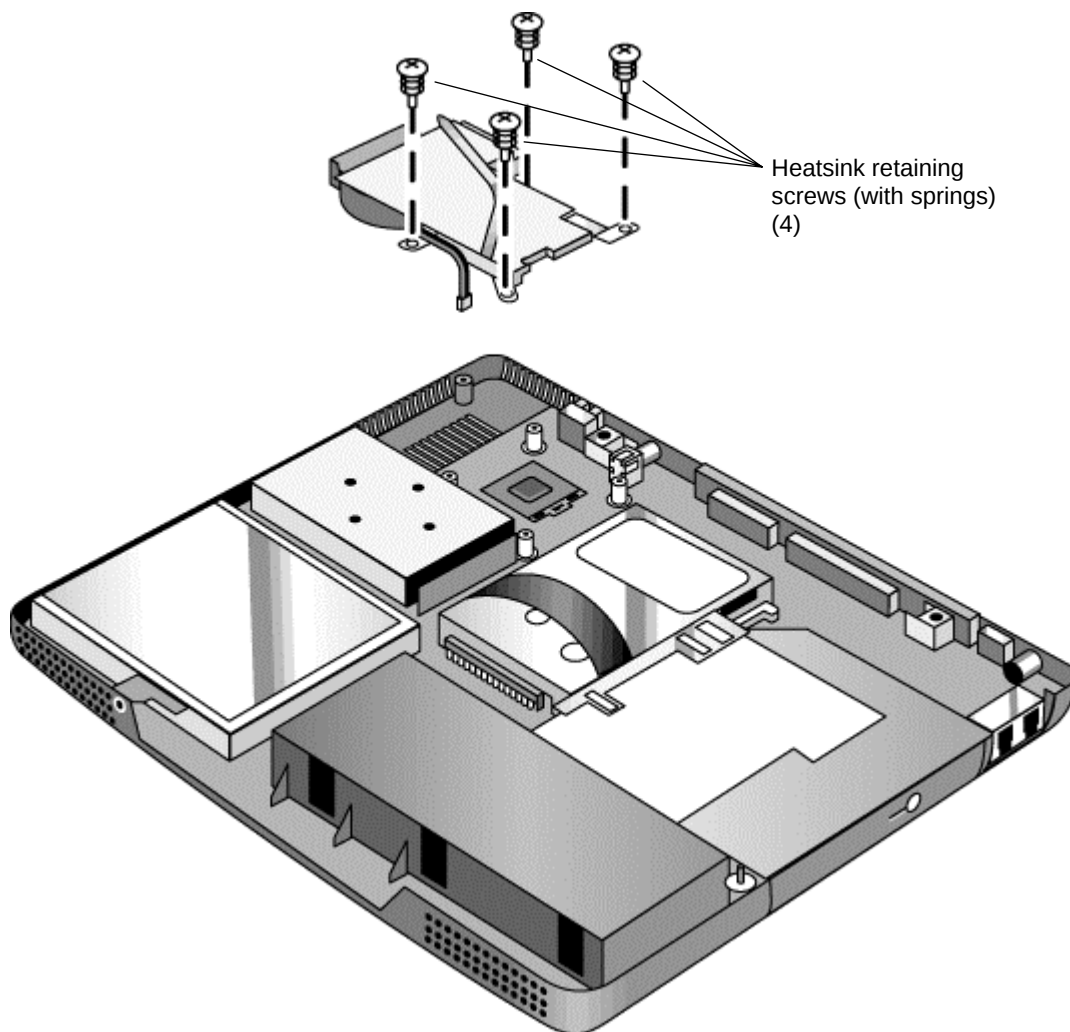


Figure 2-20. Removing the Heatsink Assembly

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.

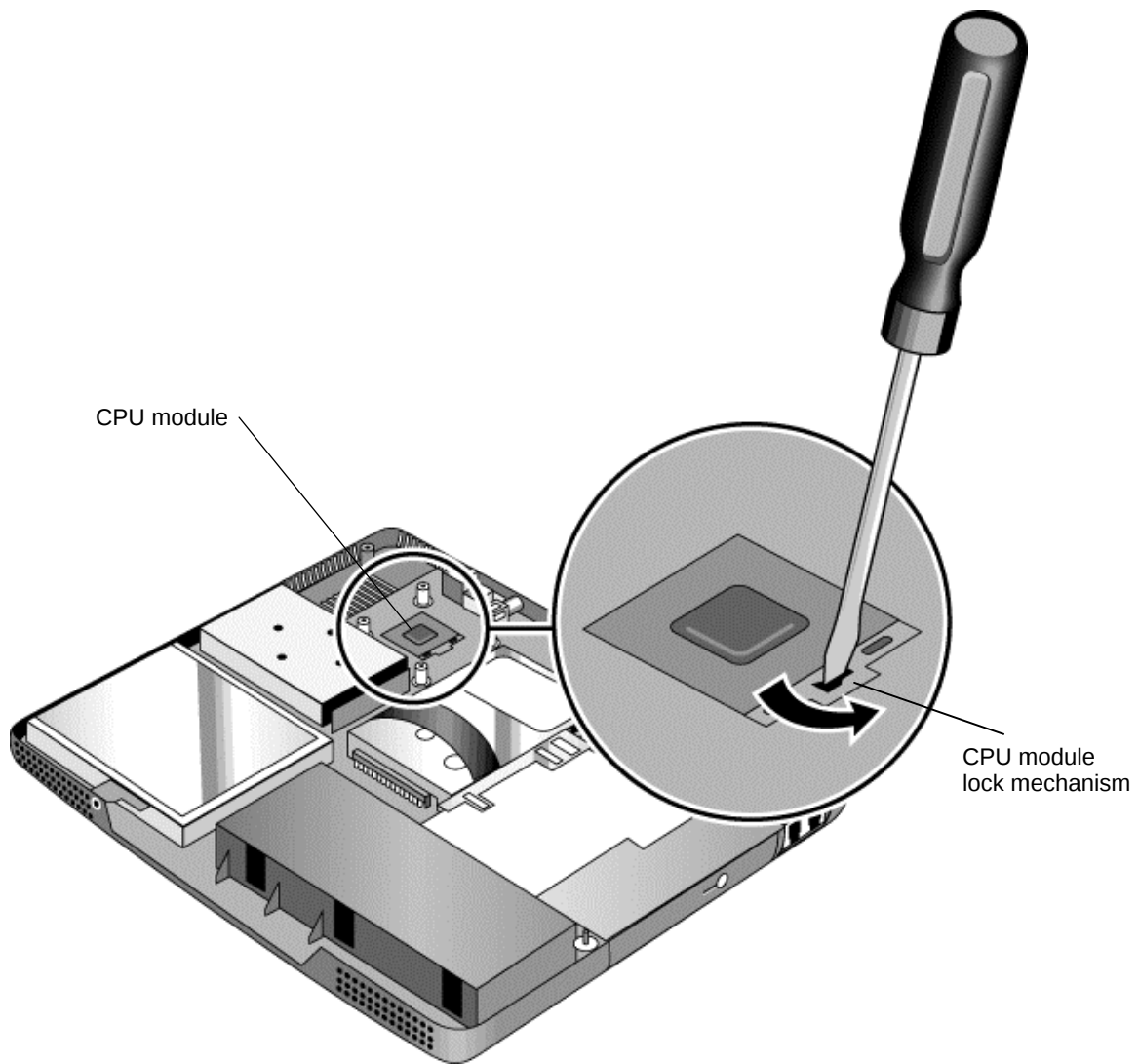


Figure 2-21. Removing the CPU Module

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.)