



# PowerBook 2400c

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PowerBook 2400c/180





## Basics

PowerBook 2400c





## Overview

The PowerBook 2400c/180 is a high performance, lightweight portable computer aimed at the mobile professional. Designed by Apple in collaboration with IBM Japan, this PCI-based compact PowerBook includes a 180 MHz PowerPC processor and a full range of built-in ports for both speed and easy network connectivity.





# Configuration

The following is the PowerBook 2400c/180 configuration:

- Processor: 180 MHz PowerPC 603ev with 256K level 2 cache
- RAM: 16 MB
- Drives: 1.3 GB hard drive
- Display: 10.4 inch active-matrix color display
- Mac OS 8

## 2400 Series Peripherals

- M5937LL/A 36-Watt AC Adapter
- M5876LL/A PowerBook 2400c Lithium Ion Battery
- M5853LL/A PowerBook 2400c External Floppy Drive
- M5239LL/A Apple HDI-30 SCSI Disk Adapter Cable
- M0207LL/A Apple HDI-30 SCSI System Cable
- 590-0289A PowerBook Video Adapter





## Service Strategy

At this time, the PowerBook 2400c is sold exclusively in Japan and in the U.S. Therefore, the full line of Apple Service and Support offerings for this product is currently available only in these two countries. Customers wishing to obtain warranty service outside of Japan or the U.S. must deliver the PowerBook 2400c, at their expense, to an Apple Authorized Service Provider in Japan or in the U.S.

Service for the PowerBook 2400c in the U.S. is through Apple central repair. Individual U.S. service providers may, however, upgrade customers' RAM and replace trackpads and keyboards.

### Ordering

Apple service providers may purchase select PowerBook





2400c service modules and parts to develop servicing capability. To order parts, use the AppleOrder system or refer to the “Service Price Pages.”

Large businesses, universities, and K-12 accounts must provide a purchase order on all transactions, including orders placed through the AppleOrder system. Service providers not enrolled in AppleOrder may fax their orders to Service Provider Support (512-908-8125) or mail them to

Apple Computer, Inc.  
Service Provider Support  
MS 212-SPS  
Austin, TX 78714-9125

If you have further questions, please call Service Provider Support at 800-919-2775 and select option #1.





## Compatibility

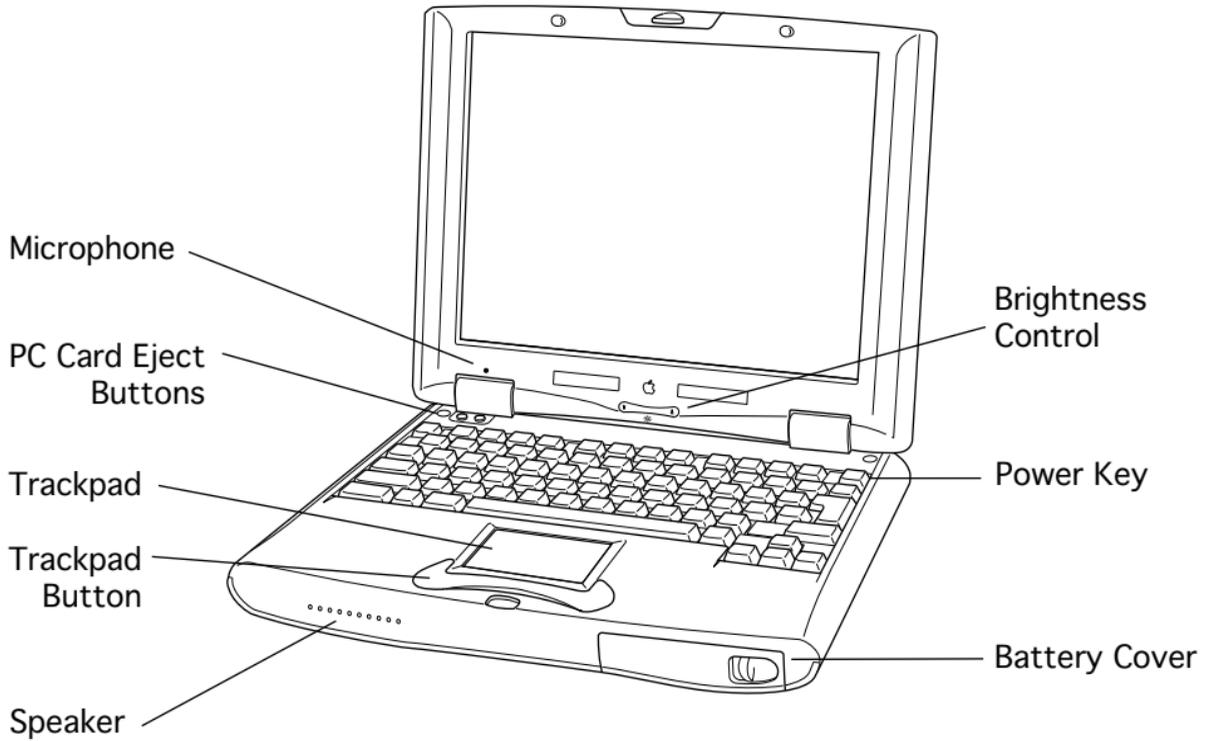
While the PowerBook 2400c offers the compact design of a PowerBook Duo, it does not share the same docking capabilities and is not compatible with any Duo accessory. Instead, the PowerBook 2400c includes a full panel of built-in ports for easy connectivity without the need for a Dock.

The PowerBook 2400c uses an external floppy drive that is not compatible with previously released PowerBooks, due to its unique connector. The floppy drive also employs a unique, removable cable.



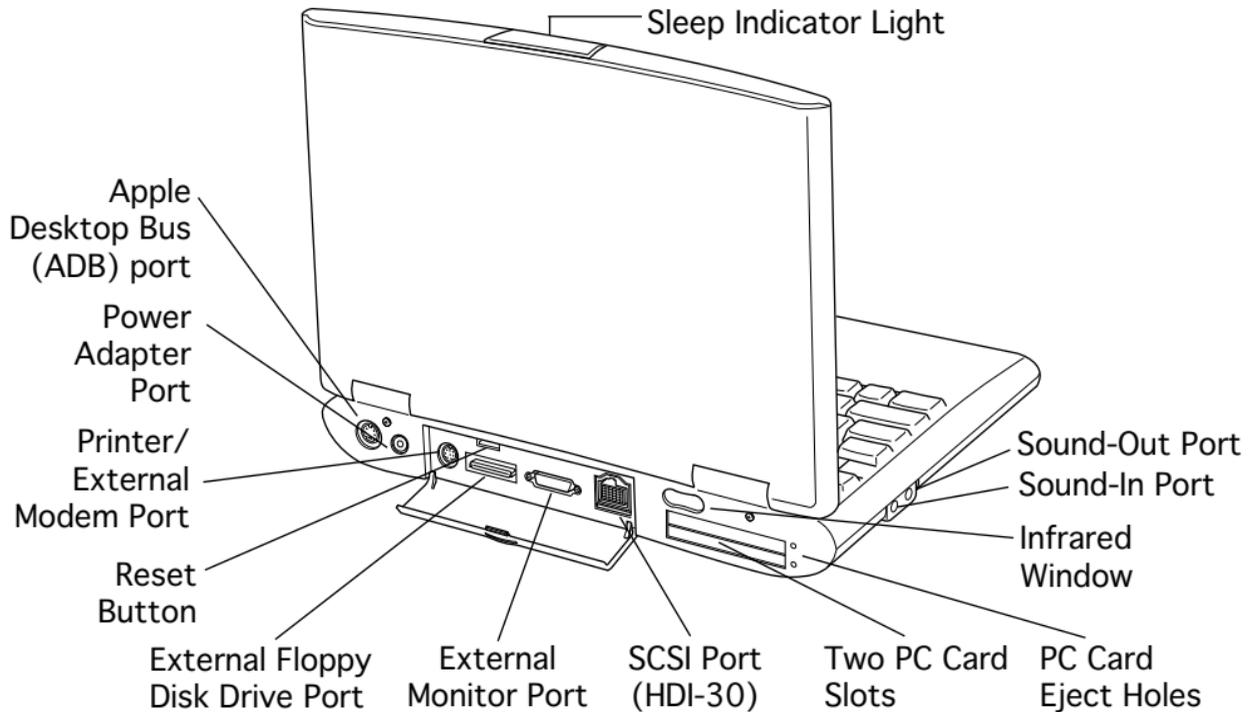


# Front View





# Rear View





# Technology

## **PowerPC 603ev**

The PowerPC 603ev chip that is the CPU in the PowerBook 2400c is the same as the CPU on the PowerBook 3400c logic board and includes a built-in cache of 32K (16K data and 16K instructions). The 603ev chip executes commands by reading from ROM, writing to RAM, and communicating with the I/O (input/output) via the PSX chip, and then outputs to the video controller for display on the screen.

## **Level 2 Cache**

To complement the Power PC 603ev processor, the PowerBook 2400c implements 256K of level 2 (L2) cache. Level 2 cache assists the processor by storing frequently





accessed instructions in the cache where they can be read quickly, thus freeing up the processor to move onto the next set of instructions.

## **ROM**

The 4 MB of ROM in the PowerBook 2400c is based on the ROM used in the PowerBook 3400c. It includes the DR emulator, which allows older 68K applications to run on the computer. The ROM data path is 64-bits wide.

## **RAM**

The PowerBook 2400c includes 16 MB of EDO DRAM located on the logic board. Service providers can also populate the computer's one expansion slot with either a 16 MB or 32 MB EDO RAM card from a third-party RAM vendor. The RAM





is low power self-refreshing with a 70 ns access time. The RAM data path is 64-bits wide.

## **PCI Architecture**

The PowerBook 2400c, like the PowerBook 3400, incorporates PCI architecture with an internal 32-bit wide data path. PCI is an industry-standard technology and features a 33 MHz system bus and a 40 MHz I/O bus.

## **Video Controller**

The video component of the PowerBook 2400c is a Chips and Technology 65550 PCI video controller. This high-performance video controller noticeably speeds up simple tasks, such as window scrolling and line draws, and provides a significant boost in high-end video. Two-dimensional





hardware acceleration provides quick video mirroring to an external monitor in presentation mode and boosts the speed of QuickTime video to a fast and smooth frame rate.

## **10.4" TFT LCD Display**

The PowerBook 2400c includes a 10.4" (measured diagonally) TFT (active-matrix) LCD panel with 800 x 600 resolution. This LCD is a fixed SVGA resolution panel capable of displaying thousands of colors but does not support 1-bit resolution (black and white), as the PowerBook 3400c does. The 16-bit video-out port makes it easy to hook up external monitors as large as 20 inches in 8-bit mode or external projectors for making large-screen presentations.





## Trackpad

As with the PowerBook 1400 and 3400 series, the built-in trackpad is tap, double-tap, and drag-capable. This PowerBook is also the first to offer an inverted "T" on the keyboard, making it easier to navigate through spreadsheets and word documents.

## Zoom Video

The PowerBook 2400c supports zoom video, a newly formed standard, and allows input from an MPEG, TV tuner, or video-capture PC card. The resulting video on the screen is a 24-bit, 30 fps, 640x480 image. Customers can also use a video camera or videoconferencing camera to conference with other users across the Internet.





## Battery Information

PowerBook 2400c customers must use only the PowerBook 2400c lithium-ion (Lilon) main battery in their computers. Batteries designed for other portable computers, such as the nickel-metal-hydride (NiMH) batteries or the Lilon battery for the PowerBook 3400c, may look similar, but they do not work with the PowerBook 2400c.

Each PowerBook 2400c battery provides power for between 2 and 4 hours of work time, depending on the system configuration and battery conservation features employed.





## Battery Handling Guidelines

The following are guidelines for properly handling PowerBook 2400c batteries:

**Warning:** Lilon batteries contain hazardous chemicals and should not be thrown out with household or office trash. Take dead batteries to an Apple authorized service provider for recycling or proper disposal. Review battery handling and disposal instructions in Safety Information in Bulletins/ Safety.

- Handle the battery carefully. Do not drop, puncture, disassemble, mutilate, or incinerate it.
- Do not leave a battery in the computer for longer than a week without plugging in the power adapter.
- Always put the battery cap on the battery when the battery is out of the PowerBook. The battery contacts should not be exposed when the battery is out of the





computer.

- Do not leave the battery in hot locations (such as the trunk of a car).
- Do not leave a battery in storage for longer than six months without recharging it.
- Never get batteries wet.
- Do not short-circuit the battery terminals. Doing so may cause an explosion or a fire.
- Recharge batteries only as described in the user's manual and only in ventilated areas.





## PC Cards

The PowerBook 2400c includes two PC card slots, which accept a variety of third-party PC cards with 68-pin connectors.

There are three types of PC cards: Type I (3.3 mm), Type II (5 mm), and Type III (10.5 mm). Type I and II cards fit in either the upper or lower PC card slot. Type III cards can only be used in the lower slot and when in place do not allow the upper slot to be used.

### **PC Card Handling**

The following are guidelines for properly handling PC cards:

- Use only cards that are compatible with the PC card unit. Refer to the compatibility information that came with the





card. If you cannot find the compatibility information, call the card vendor.

- Do not insert anything other than a PC card into the card slots.
- The computer must be on or off in order to eject a PC card. When the computer is in sleep mode, a PC card cannot be ejected.
- Before you eject a card, make sure nothing is blocking the card's slot.
- If you want to use the card again immediately, pull it out about 2 inches and then push it back in. If you don't follow this procedure and try to push the card back in to use it again, the card will not engage properly.
- Do not pull on a PC card before it has been ejected out of the slot. Forcing a PC card out of the slot may damage the computer or the card.





## Specifications

PowerBook 2400c





## Processor

### **CPU**

PowerPC 603ev microprocessor running at 180 MHz

### **Cache**

256 KB, second-level (L2) cache





## Memory

**RAM** 16 MB, expandable to 80 MB

**ROM** 4 MB

**VRAM** 1 MB





## Disk Storage

### **Floppy Drive**

External 1.44 MB floppy drive. Reads and writes Macintosh 1.4 MB and 800K floppy disks, as well as Windows, DOS, and OS/2 720K and 1.44 MB floppy disks.

### **Hard Drive**

1.3 GB 2.5" hard drive





## I/O Interfaces

### **SCSI**

SCSI port (HDI-30 connector) for hard drives, scanners, printers, and other devices; also supports PowerBook SCSI disk mode, but not to another PowerBook

### **PC Cards**

Two PC (PCMCIA) card slots support either two Type I or Type II cards or one Type III card  
Lower slot also supports “zoom video,” a method of displaying video signals from a PC card

### **ADB**

Apple Desktop Bus (ADB) port for keyboard, mouse, or other input devices using a low-speed, synchronous serial bus  
200 mA maximum current draw for all ADB devices  
Supports up to three ADB devices in a daisy chain





- Serial** Serial port for printer, modem (including Geo Port support), LocalTalk network, or other serial devices (RS-422)
- Sound** Sound output port for external audio amplifier/powered speakers, stereo mini-jack, 3-connector, standard 3.5-mm stereo miniplug  
Sound input port for stereo sound input (line level), stereo mini-jack, 3-connector, standard 3.5-mm stereo miniplug  
16-bit stereo sound in and out supports 44.1 kHz (“CD quality” sound), 22 kHz, and 11 kHz sample rates  
One built-in speaker housed in the front panel
- Infrared** Built-in infrared that supports two types of transmission—IRTalk and 1 megabit-per-second IRDA  
Single IR lens with range of 18–20 inches





**Power Adapter**

Power adapter port

**Video**

Video port for up to 16-bit/thousands-of-color video output to most Apple monitors (with the supplied adapter), VGA monitors (640 x 480), and SVGA monitors (800 x 600)





## I/O Devices

### **Keyboard**

Built-in keyboard with 12 function keys  
76 keys domestic, 79 keys Japan  
3.0-mm travel keyboard  
16.5-mm vertical and horizontal pitch

### **Trackpad**

Integrated, solid-state trackpad

### **Microphone**

Electret mono  
Supports amplified microphones only  
No PlainTalk or omnidirectional mic support  
Line level input only





## Video

### **Video Display**

10.4" diagonal, 800 x 600 active matrix (TFT); thousands of colors





## Electrical

### **Main Battery**

Rechargeable lithium ion (Lilon) battery  
2-4 hours of use before recharging

### **Power Adapter**

36 W

### **Backup Battery**

30 milliampere (mAh) rechargeable lithium battery for calendar/clock maintenance. Also backs up contents of RAM for a few minutes while battery is changed (when PowerBook is in sleep mode).





## Physical

### **Dimensions**

Height: 1.9 in. (4.7 cm)

Width: 10.5 in. (26.7 cm)

Depth: 8.4 in. (21.3 cm)

### **Weight**

4.4 lb. (2.0 kg)





## Environmental

<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)
<b>Storage Temperature</b>	-13° to 140° F (-25° to 60° C)
<b>Relative Humidity</b>	20% to 90% noncondensing
<b>Operating Altitude</b>	10,000 ft. (3048 m) maximum
<b>Shipping/Non-Operating Altitude</b>	20,000 ft. (6300 m) maximum





Take Apart

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PowerBook 2400c



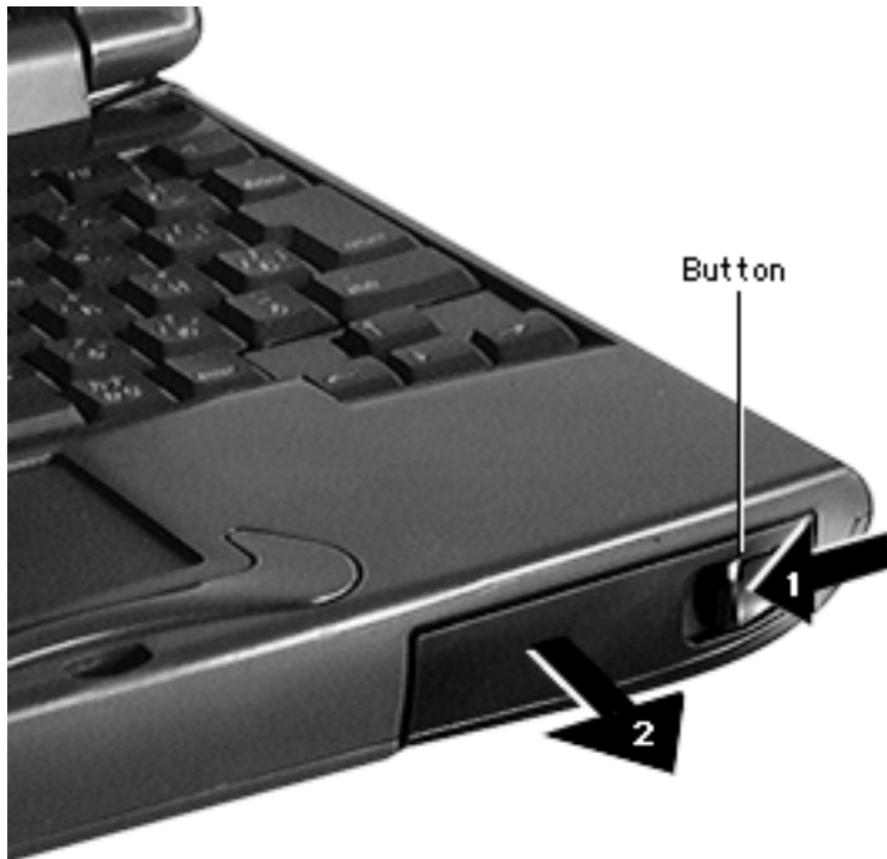


## Battery

Before you begin, unplug the power adapter.

**Caution:** You must remove the battery before performing any take-apart procedure.





Push the button and slide the battery out of the computer.

**Replacement Caution:** You must install the battery before connecting the power adapter.





## Top Case

Before you begin, remove the battery.





- 1 Using a Phillips jeweler's screwdriver, remove the two screws from the top case.
- 2 **Caution:** You may have to use some pressure to lift the left side of the top case. Be careful not to tear the display cable that lies directly below this side of the case.

Using a jeweler's flat-blade screwdriver, release the two front top case latches, pry up the top case, and remove it from the computer.





## Palm Rest

Before you begin, remove the following:

- Battery
- Top case



Palm Rest



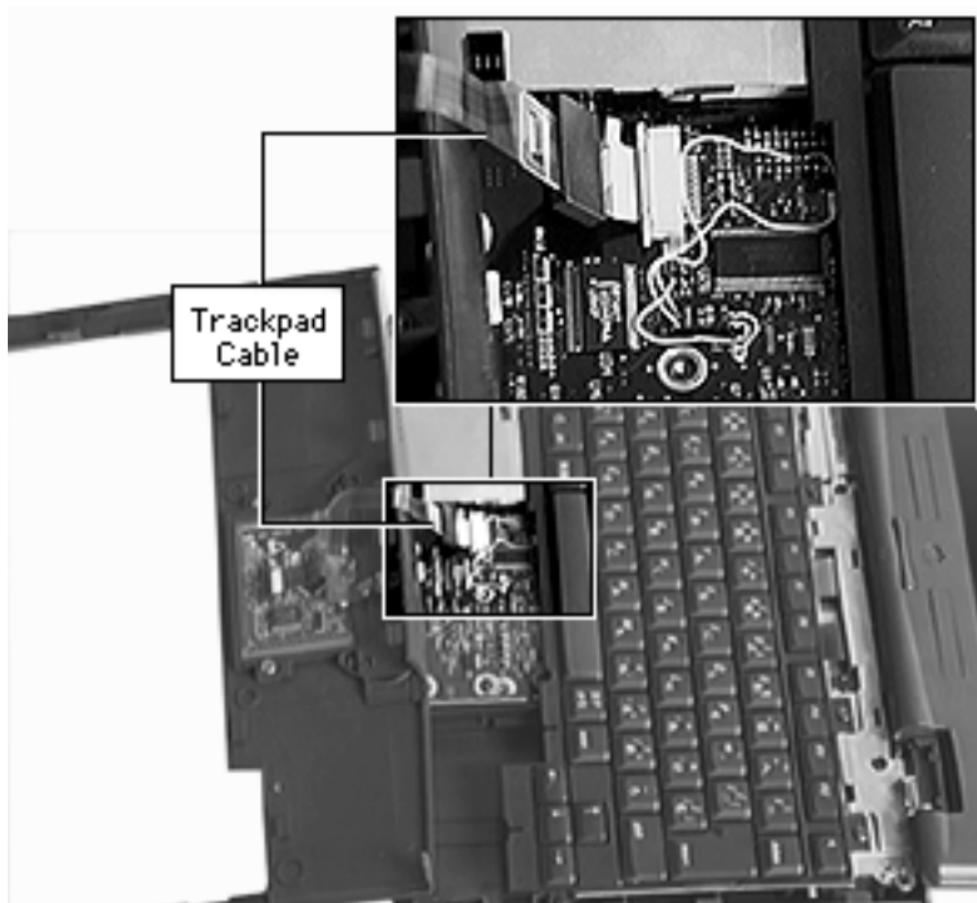


- 1 Lift up and remove the hinge cover.

**Caution:** The palm rest is attached to the rest of the computer by the trackpad cable. Do not lift the palm rest more than 1 inch above the keyboard until after you have disconnected the cable.

- 2 Holding the palm rest by the battery bay and the upper left corner, gently slide the palm rest forward, lift, and release its latches from the bottom case.





- 3 Carefully rotate the palm rest toward you so that the trackpad cable is exposed.
- 4 Release the locking tab and disconnect the trackpad cable from the logic board.
- 5 Remove the palm rest from the computer.

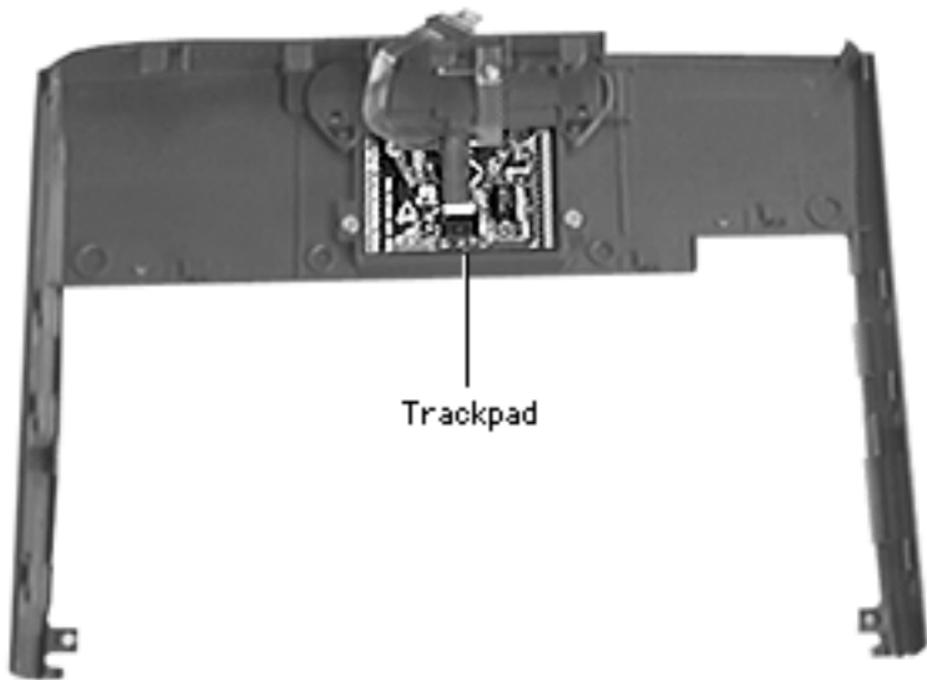


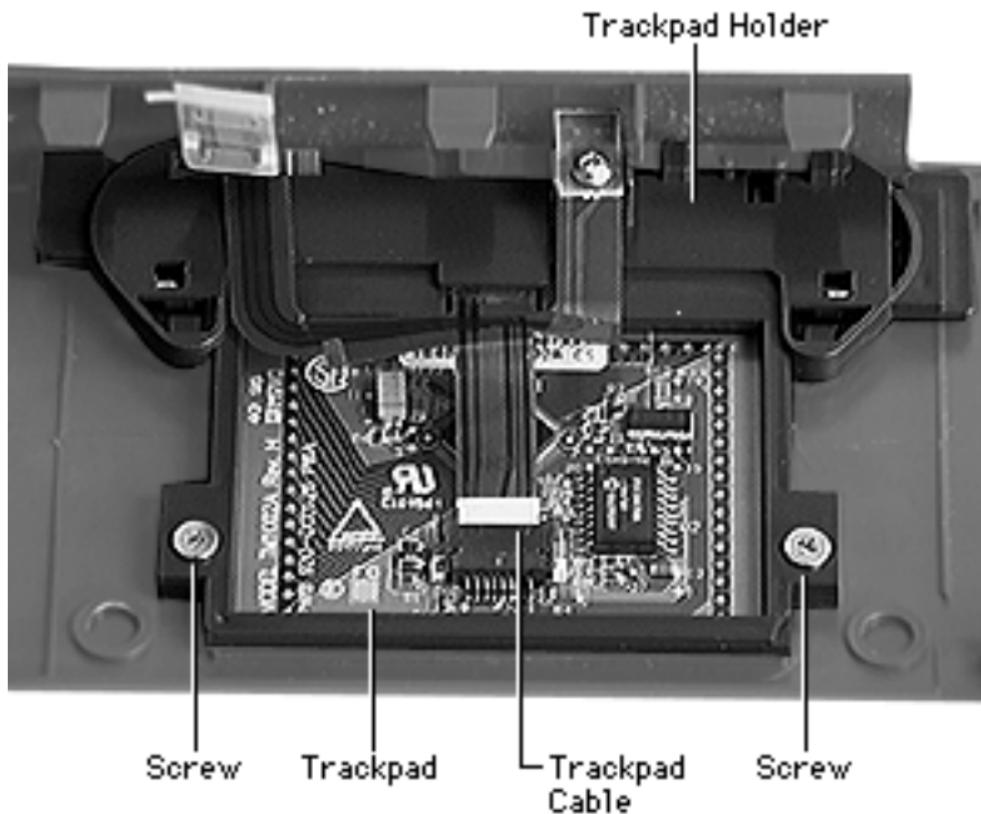


## Trackpad

Before you begin, remove the following:

- Battery
- Top case
- Palm rest





- 1 Using a Phillips jeweler's screwdriver, remove the two screws from the trackpad holder.
- 2 Release the locking tab and disconnect the trackpad cable from the trackpad.
- 3 Lift off the trackpad holder and cable.
- 4 Remove the trackpad from the palm rest.



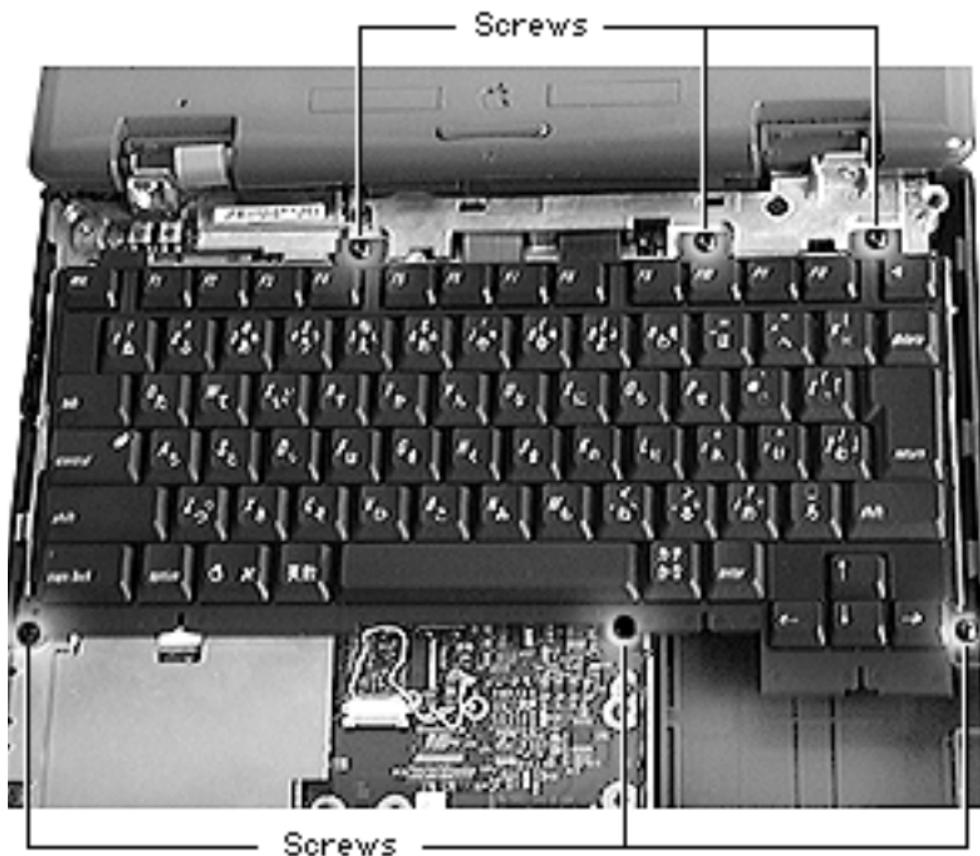


## Keyboard

Before you begin, remove the following:

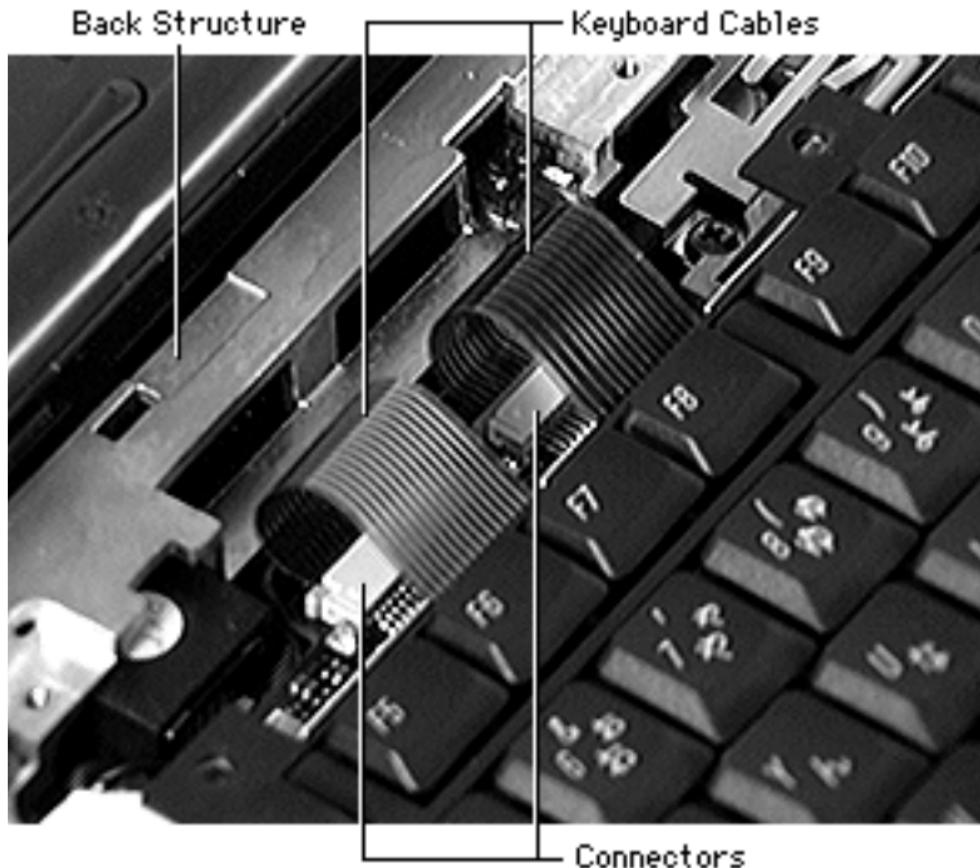
- Battery
- Top case
- Palm rest





- 1 Using a Phillips jeweler's screwdriver, remove the six keyboard mounting screws.





- 2 Carefully slide the keyboard forward 1 inch to expose the two keyboard connectors.
- 3 Release the locking tabs and remove the two keyboard cables from the logic board.
- 4 Remove the keyboard from the computer.

**Replacement Note:** When replacing the keyboard, be sure the loops of the keyboard cables are inserted under the back structure.

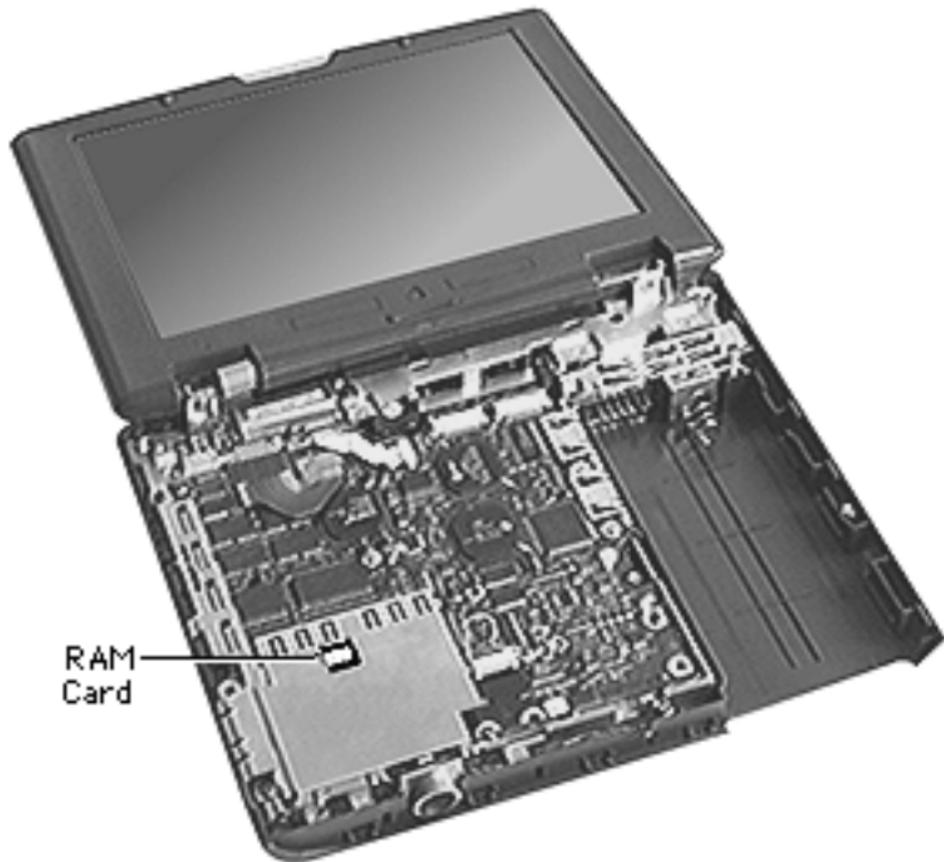




## RAM Card

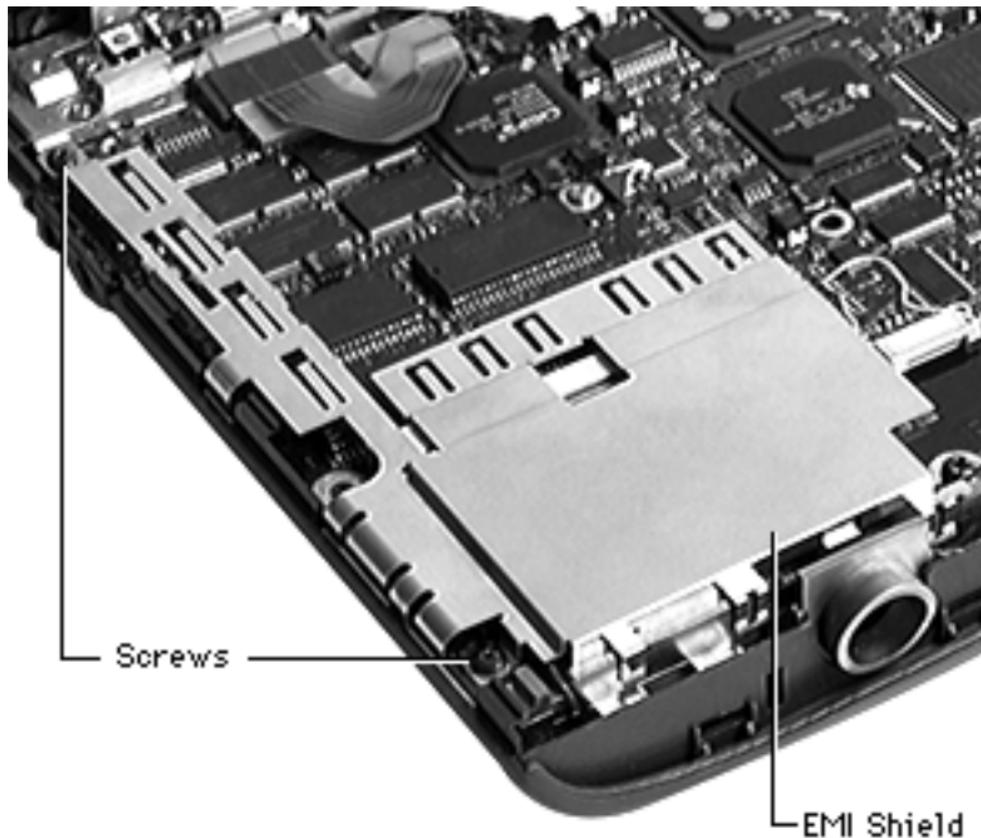
Before you begin, remove the following:

- Battery
- Top case
- Palm rest
- Keyboard



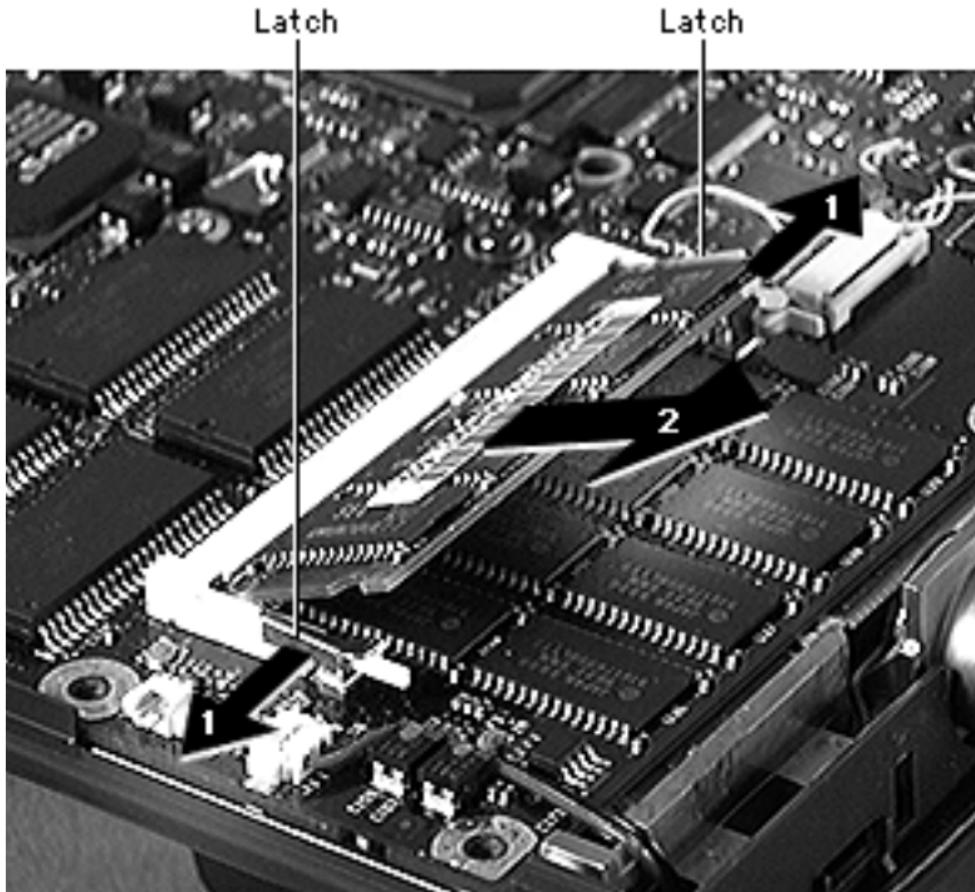
RAM  
Card





- 1 Using a Phillips jeweler's screwdriver, remove the two screws from the EMI shield.
- 2 Remove the EMI shield from the computer.





- 3 **Caution:** When removing or inserting a RAM card, hold the card by the edges—never by the chips.

Release the two latches on the sides of the RAM card connector and remove the card from the connector.

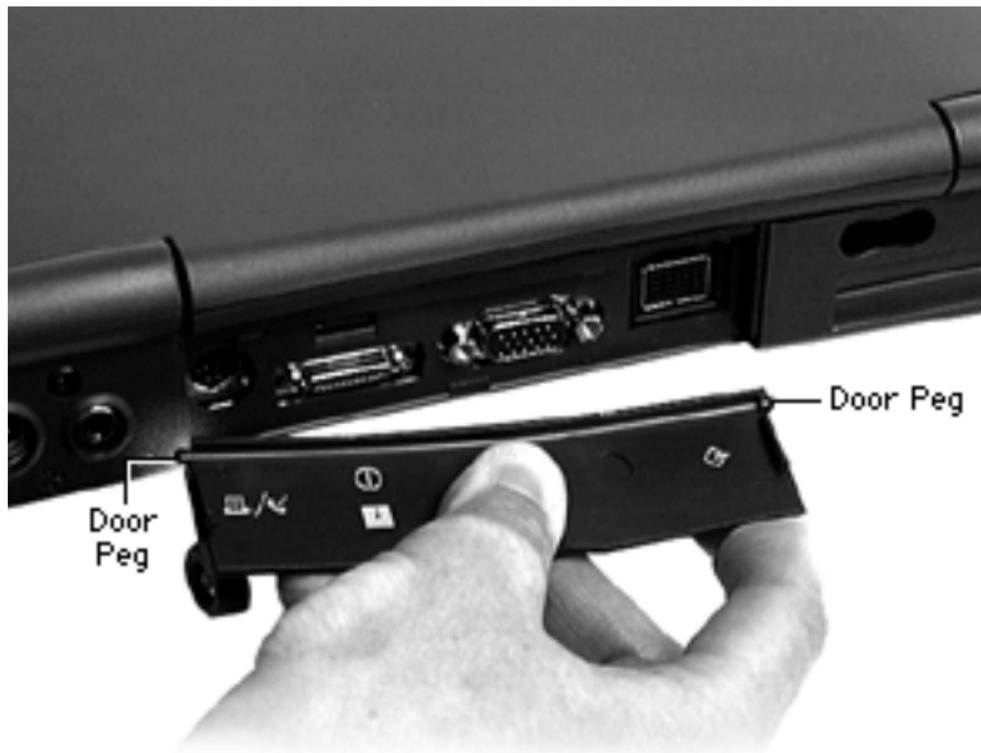




## I/O Door

No preliminary steps are required.





- 1 Open the I/O door.
- 2 Carefully bend the door so that the middle bows downward.
- 3 Unhinge the door pegs and remove the I/O door.

