Installing Expansion Cards

The instructions in this booklet tell you how to install expansion cards in Macintosh PowerBook 1400 series computers. You can install two different types of cards in the computer:

■ a RAM card

■ an expansion slot card with back-panel connector

You can install two RAM cards (one above the other, piggyback style) and one expansion slot card.

Note: You should attempt to install a RAM card or an expansion slot card only if you are comfortable working with electronic equipment. You should read all of the following instructions before you begin. If the procedure sounds like something you don't want to do yourself, any Apple-authorized service provider can install the card for you (for a service charge).
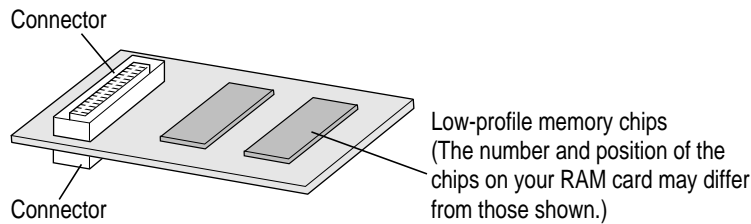
> **WARNING** If you attempt to install a RAM card or an expansion slot card yourself, any damage you may cause to your equipment will not be covered by the limited warranty on your computer. See an Apple-authorized dealer or service provider for additional information about this or any other warranty question.

Installing a RAM card

You need the RAM card and small Phillips and flat-blade screwdrivers for the installation.

Make sure you are installing a RAM card made for a Macintosh PowerBook 1400 series computer. The RAM card must use low-profile memory chips.

The card has connectors on the top and bottom so that another RAM card can be plugged into it, piggyback style. You can install this type of card in the lower position (if no RAM card is already installed) or the upper position (if a RAM card is already installed).

Connector

Connector

Low-profile memory chips
(The number and position of the chips on your RAM card may differ from those shown.)

To install the RAM card, follow these steps:

1   Check the amount of RAM currently installed in your computer by choosing About This Macintosh from the Apple () menu.

You must be in the Finder to see About This Macintosh. If necessary, click anywhere on the desktop to make the Finder active.

Make a note of the amount of built-in memory.

2   Disconnect all cables from the computer, including the power adapter. Make sure the computer is turned off.

3 **Remove the battery from the computer.**

If you're unfamiliar with this procedure, follow the instructions in "Removing or Replacing the Battery" in Chapter 5 of the user's manual for your computer.

> **WARNING** Do not install a RAM card without disconnecting the power adapter and removing the battery. Installing a card while a power source is connected could damage the computer.

4 **Slide the speaker grill (above the top row of keys) to the left and lift it out of the computer.**

The grill is held in place firmly and may require some force to move it sideways.

Slide speaker grill to the left, then lift.
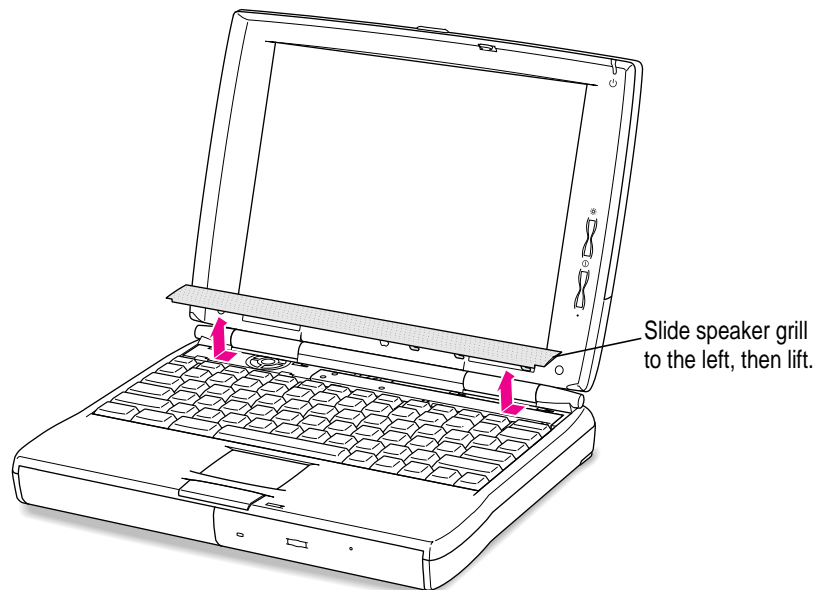
Set the speaker grill aside.

5 **Place your finger under the top edge of the keyboard and gently fold it forward so that the keyboard rests upside down on the lower part of the computer's case.**

If you can't easily put your finger under the keyboard, carefully slide the end of the flat screwdriver under it and lift.

Take care not to move the bottom edge of the keyboard away from the case, to avoid straining or disconnecting the keyboard's cable.
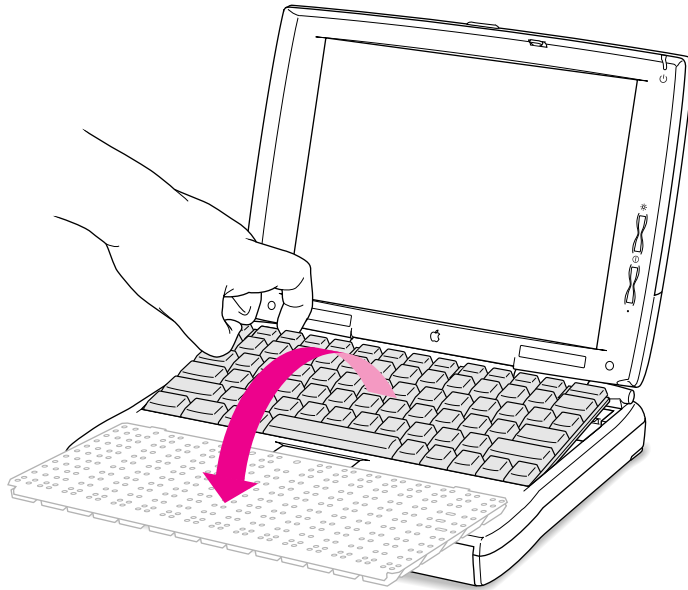
6 **Remove the six screws holding the metal heat shield in place. Then lift out the heat shield and set the shield and screws aside.**

Use the small Phillips screwdriver to loosen the screws.

Note that the two screws at the rear corners of the shield are longer than the other four screws.

Long screws
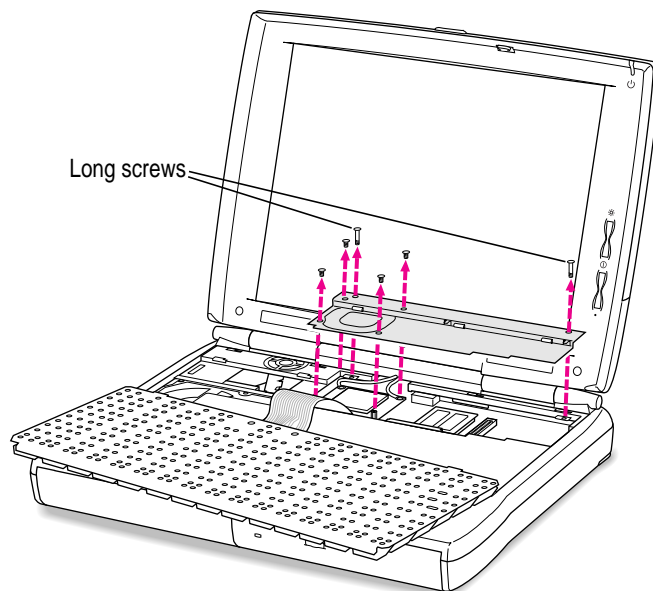
7 **Locate the vertical connector for the RAM card near the right side of the computer.**

The connector is approximately 2 inches in from the right side of the case. The RAM card's design allows for one card to be connected to the socket on top of a card that is installed on the computer's main logic board. Therefore, your computer may have a RAM card already installed; if so, you will still see the vertical connector on the top of the installed RAM card. (See the illustration at the beginning of these instructions for reference.)

Vertical connector for RAM card
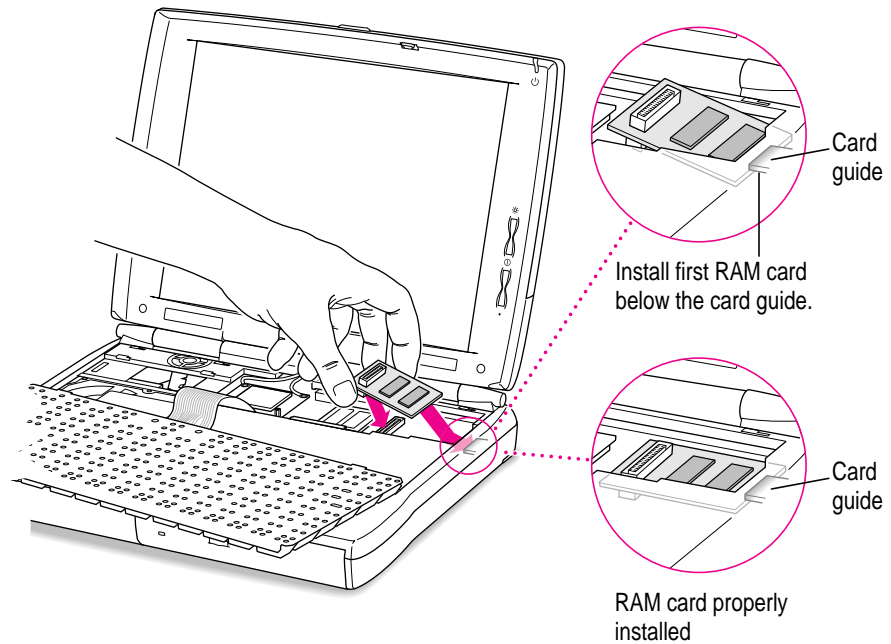
RAM card fits into vertical connector.
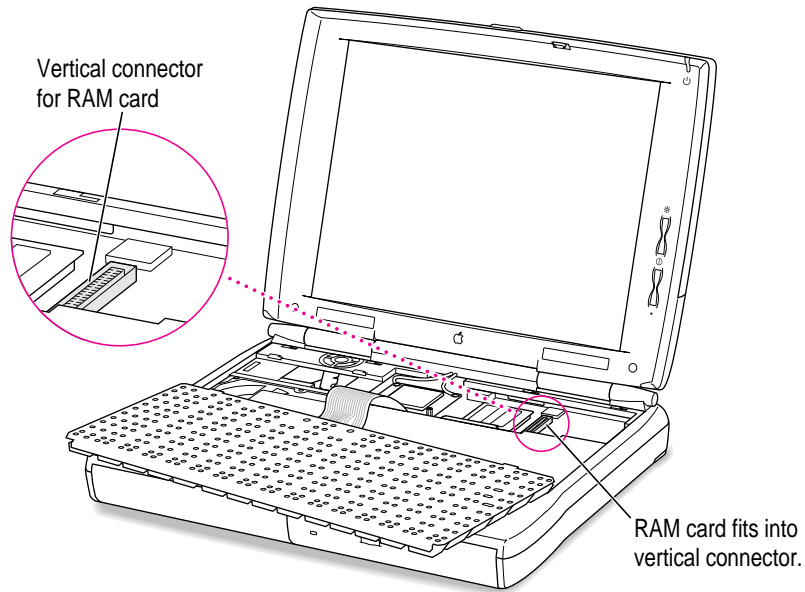
The area around the RAM card's vertical connector may be partially obscured if your computer has a card installed in the expansion card slot (not used for a RAM card).

8 **Carefully remove the RAM card from its packaging and position it above the area for installation in the computer.**

Hold the card by its edges on the left side, taking care not to touch any of the components or the wires inside the connectors.

9 **Tilt the right side of the card so that its right edge fits under the right edge of the computer's case and slip the card's right edge into the card guide on the inside of the case.**

■ If a RAM card has not been installed, slide the right edge of the card below the card guide.

Card guide

Install first RAM card below the card guide.

Card guide

RAM card properly installed

■ If a RAM card is already installed, slide the right edge of the card above the card guide.

A second RAM card can be installed above the card guide.

Card guide
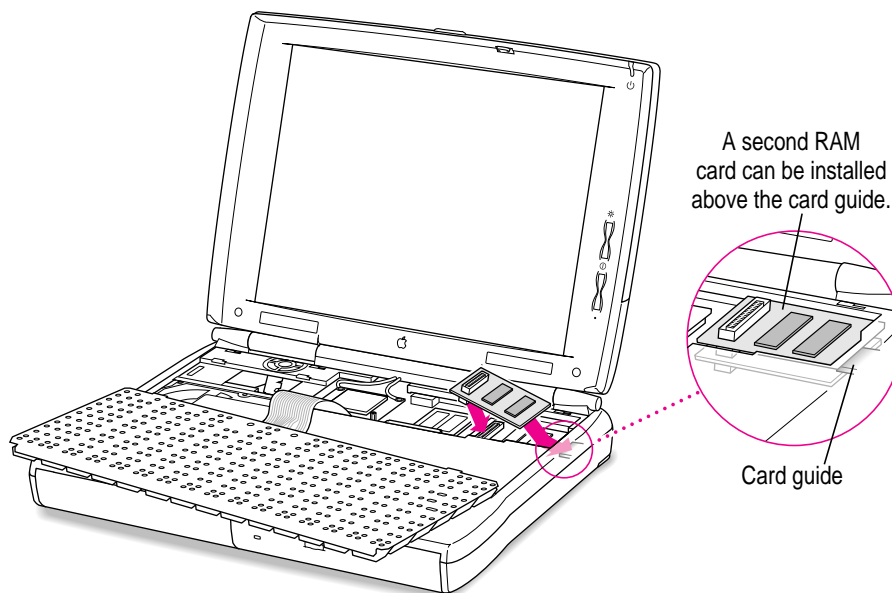
10 **Lower the left side of the card so that its connector is aligned with the vertical connector in the computer and gently push the card down until it is seated.**

If the two connectors don't join easily, detach the card and align the connectors again. Forcing the connectors together could damage the card or the socket.
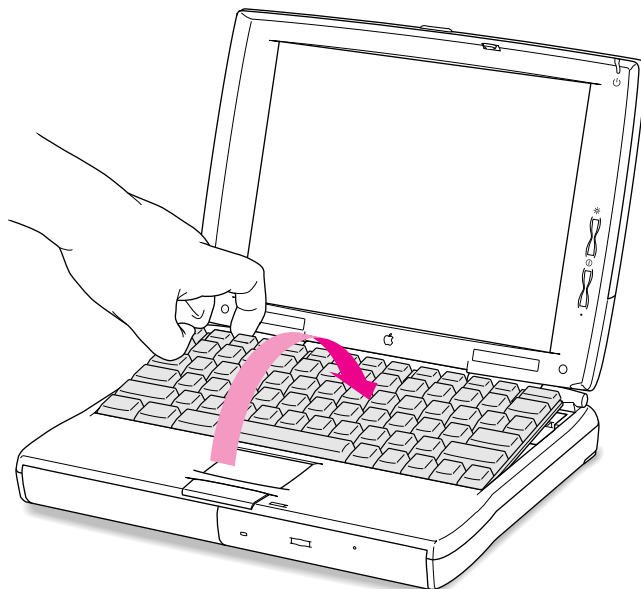
11 **Replace the metal heat shield and fasten it in place with the screws.**

Slide the front edge of the heat shield under the case, then lower the back of the shield.

Be sure to put the long screws at the two rear corners of the shield.

Long screws
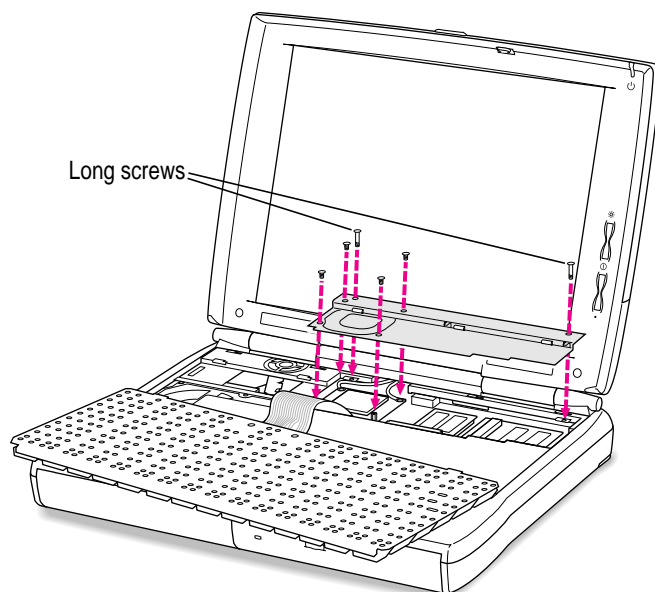
12 **Replace the keyboard by folding it backward and lowering the top edge into place.**

13 **Replace the speaker grill by lowering it into the opening above the top row of keys. Slide the grill to the right to secure it.**

Position it so that the three downward-pointing tabs are at the right front of the grill. The tabs click into place when you slide the grill to the right.

Lower the speaker grill, then slide it to the right.
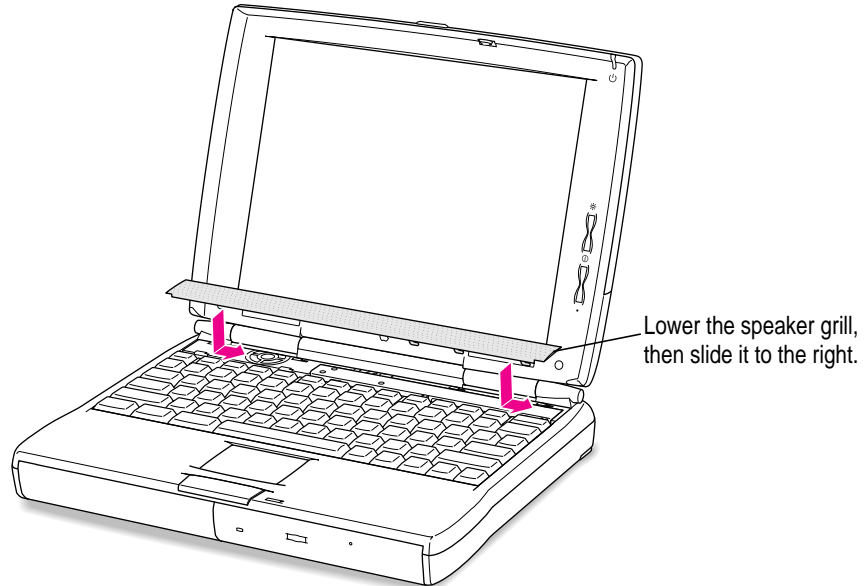
14 **Replace the battery and reconnect the plugs, cables, and power adapter.**

Now you're ready to use the expanded RAM in your PowerBook.

Making sure the RAM card is properly installed

Once you have completed the process for installing a RAM card, you can check to make sure the additional RAM is now available on your computer. Follow these steps:

1   **Press the Power (on/off) key to turn your computer on.**

2   **Choose About This Macintosh from the Apple () menu.**

3   **Look at the amount of memory in your computer.**

Your total memory (or total built-in memory, if you have virtual memory turned on) should be the amount built-in memory you noted before installing the RAM card plus the amount of RAM in the card that you just installed.

If the total memory number does not include the amount of RAM you installed, review the steps for installing a RAM card to make sure you installed the card correctly. If you need more help, see an Apple-authorized dealer.

If you hear eight tones when the computer starts up, there may be a problem with the RAM card. If you installed the RAM card in your computer yourself, review the steps in this appendix to make sure you installed the card correctly. If you purchased an expansion card from a third-party manufacturer, contact the manufacturer for help.

Installing an expansion slot card

You can install an expansion slot card in your PowerBook to add a port for external connections to the computer. One type of expansion slot card available for your Macintosh PowerBook 1400 series computer provides a video connection for an external monitor.

You need the expansion slot card and small Phillips and flat-blade screwdrivers for the installation.

To install an expansion slot card, follow these steps:

1 **Disconnect all cables from the computer, including the power adapter. Make sure the computer is turned off.**

2 **Remove the battery from the computer.**

If you're unfamiliar with this procedure, follow the instructions in "Removing or Replacing the Battery" in Chapter 5 of the user's manual for your computer.

> **WARNING** Do not install an expansion slot card without disconnecting the power adapter and removing the battery. Installing a card while a power source is connected could damage the computer.

3 **Open the door that covers the ports on the back panel of the computer.**

**4** **Use a small flat-blade screwdriver to remove the expansion port cover.**

The cover is held firmly in place by small tabs. You may need to pry it off by placing the screwdriver in the small indentation at the center of the cover's right edge.

Expansion port cover

Small flat-blade screwdriver
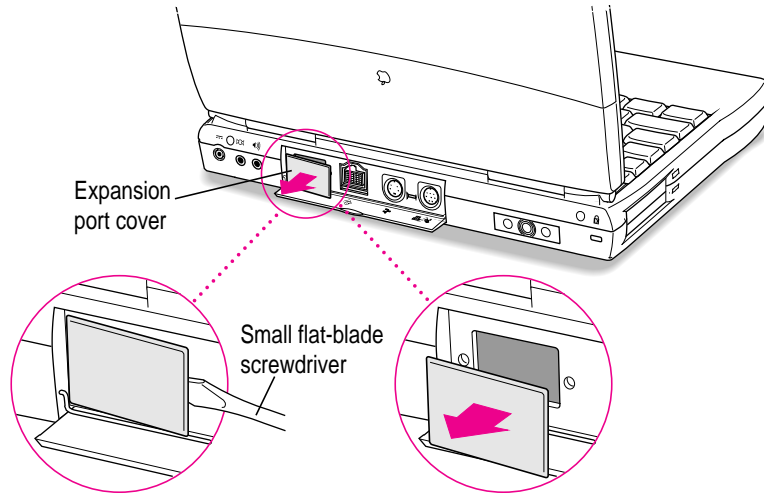
Be sure to save the cover so that you can replace it should you remove the expansion slot card later.

5 **Slide the speaker grill (above the top row of keys) to the left and lift it out of the computer.**

The grill is held in place firmly and may require some force to move it sideways.

Slide speaker grill to the left, then lift.
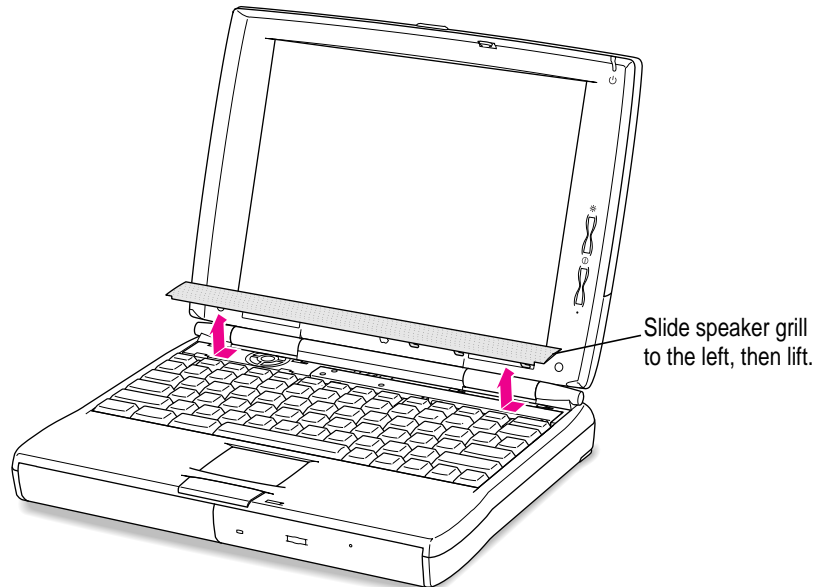
Set the speaker grill aside.

6 **Place your finger under the top edge of the keyboard and gently fold it forward so that the keyboard rests upside down on the lower part of the computer's case.**

If you can't easily put your finger under the keyboard, carefully slide the end of the flat screwdriver under it and lift.

Take care not to move the bottom edge of the keyboard away from the case, to avoid straining or disconnecting the keyboard's cable.
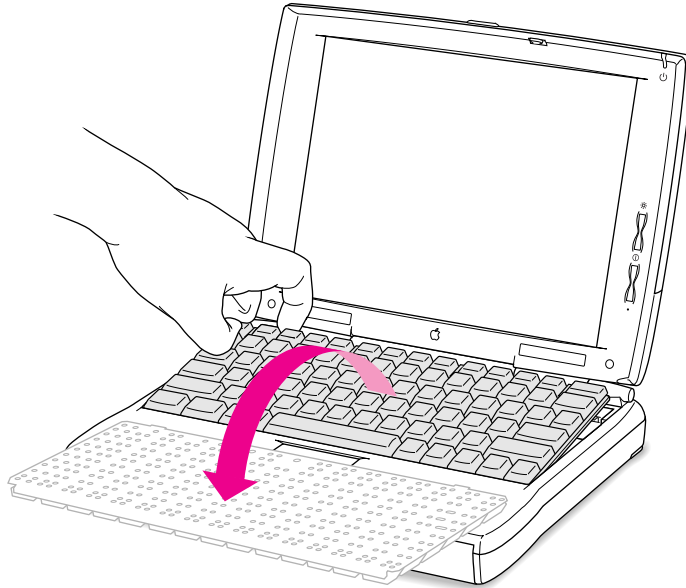
7 **Remove the six screws holding the metal heat shield in place. Then lift out the heat shield and set the shield and screws aside.**

Use a small Phillips screwdriver to loosen the screws.

Note that the two screws at the rear corners of the shield are longer than the other four screws.

Long screws
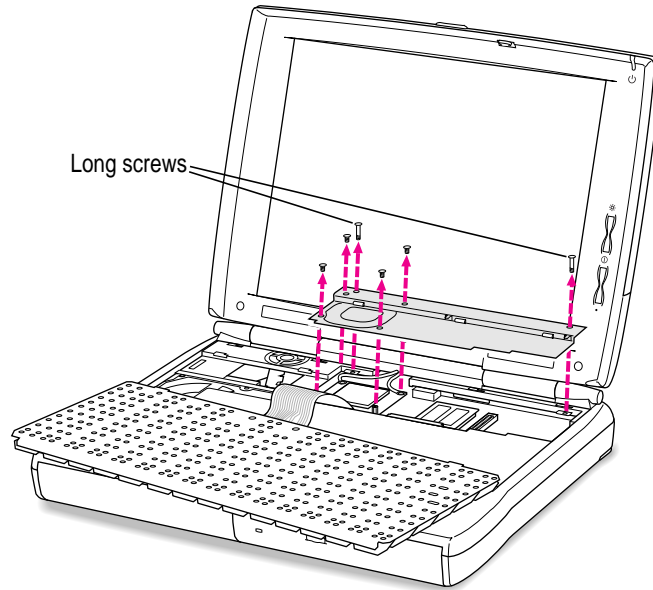
8   **Locate the horizontal connector for the expansion slot card near the center of the computer.**

The connector is about one-half inch to the right of the keyboard cable.

If you don't see the horizontal connector next to the keyboard cable, an expansion slot card may already be installed in your computer.

9   **Remove the expansion slot card from its packaging and position it above the area for installation in the computer.**

Hold the card by its edges, with the connector facing down at the end closer to you. Take care not to touch any of the components or the wires inside the connectors.

The card's package should also include two small screws and a plastic cover with the center cut out. Set these aside for use when the card is installed.

10   **Carefully lower the card into the computer, rear edge first, and guide it into position against the back of the case.**

As you slide the card into the computer, use a slight side-to-side movement to fit it into the small space.

Expansion card socket

Expansion card socket
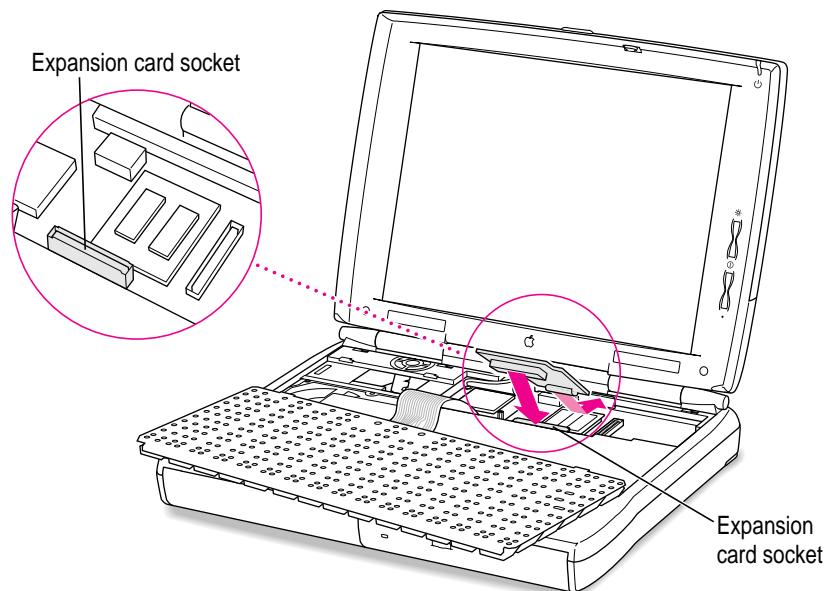
11 **Align the card's connector with the horizontal connector in the computer and gently push the card down until it is seated.**

If the two connectors don't join easily, detach the card and align the connectors again. Forcing the connectors together could damage the card or the socket.
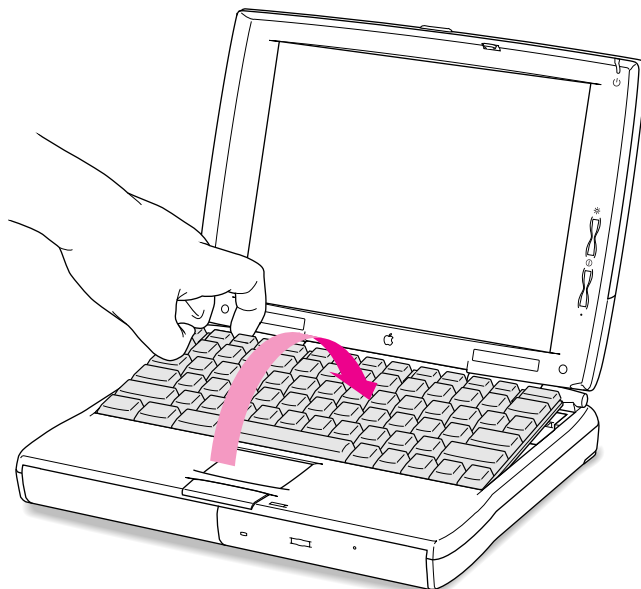
Expansion card
properly installed
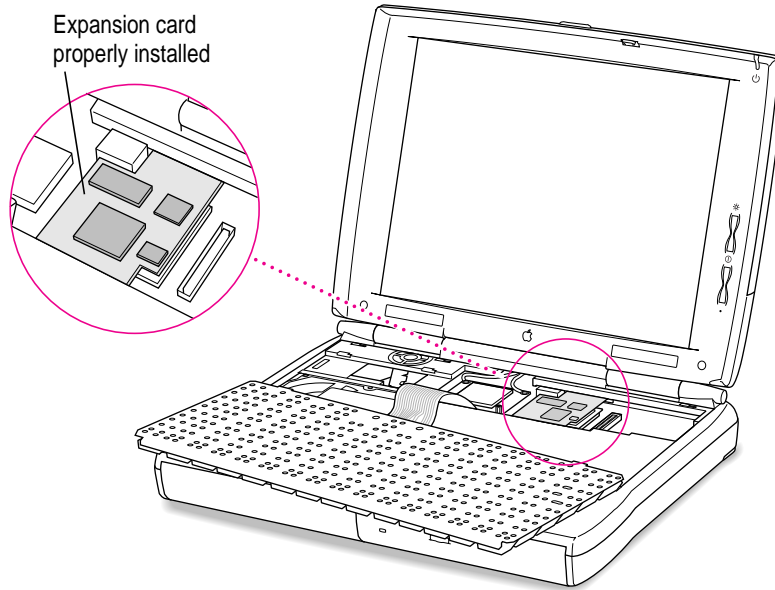
12 **Replace the metal heat shield and fasten it in place with the screws.**

Slide the front edge of the heat shield under the case, then lower the back of the shield.

Be sure to put the long screws at the two rear corners of the shield.

Long screws
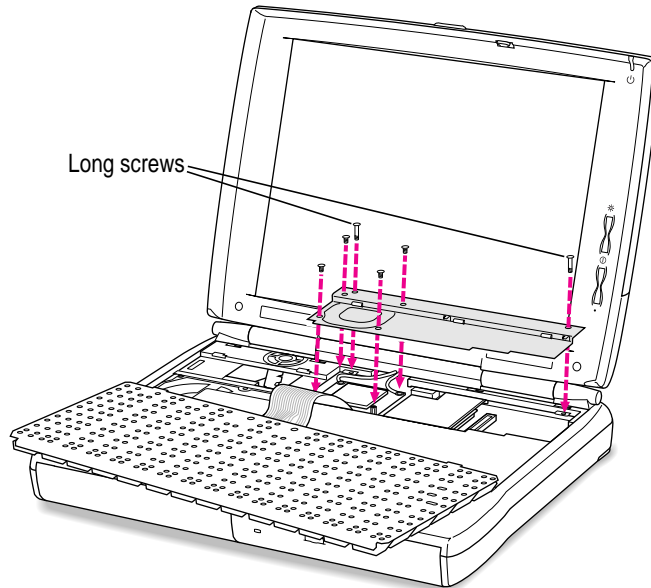
**13** **Replace the keyboard by folding it backward and lowering the top edge into place.**

14 **Replace the speaker grill by lowering it into the opening above the top row of keys. Slide the grill to the right to secure it.**

Position it so that the three downward-pointing tabs are at the right front of the grill. The tabs click into place when you slide the grill to the right.

Lower the speaker grill, then slide it to the right.
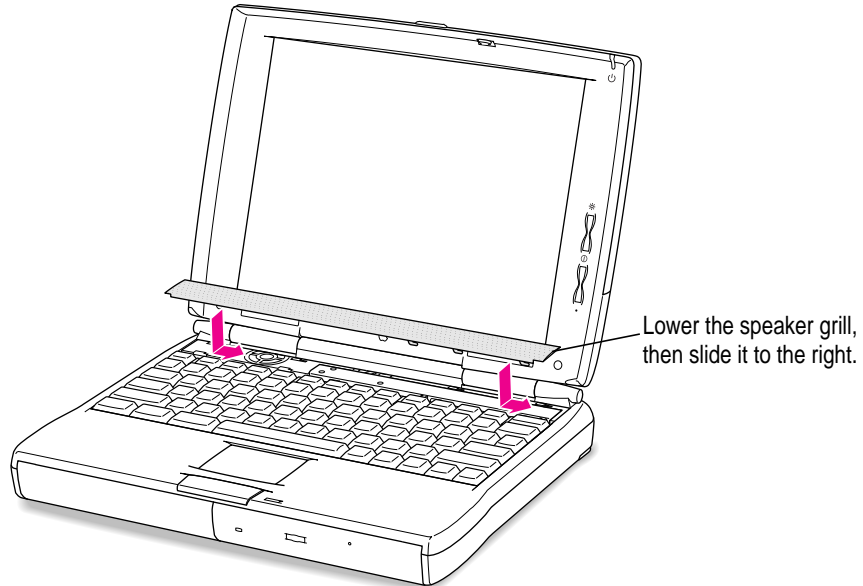
15 **Secure the card to the expansion port on the computer's back panel by fastening the two screws supplied with card into the holes in the port.**

Use a small Phillips screwdriver to tighten the screws.

Expansion
card screws

Expansion
card cover

Slide bottom left
corner under wire.
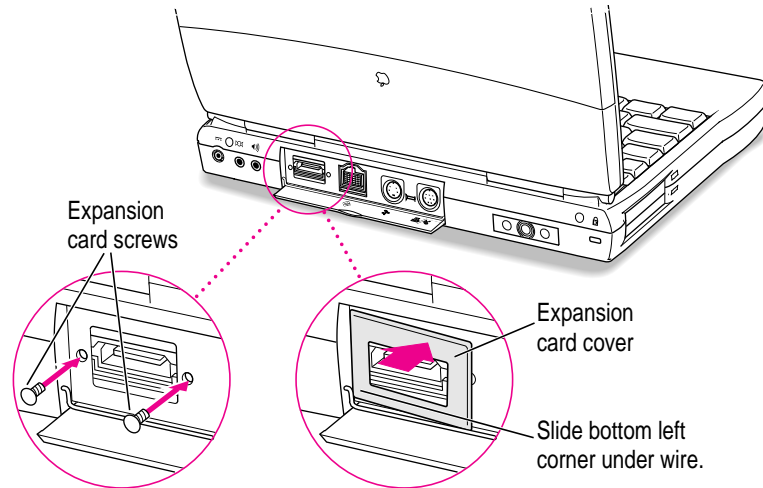
16 **Place the expansion port cover supplied with the card over the two screws and snap it into place. Be sure that the lower-left corner of the cover is under the wire hinge of the small door on the back panel.**

The cover has plastic tabs that hold it in place. You may need to push hard to attach the cover.

17 **If you plan to use the expansion slot card immediately, connect the cable or other device designed for use with the card through the opening in the cover.**

See the expansion slot card's manual for complete instructions.

18 **Replace the battery and reconnect the plugs, cables, and power adapter.**

Now you're ready to use the expansion slot card in your PowerBook.

Vous trouverez les instructions d'installation de la carte dans le Guide de l'utilisateur livré avec votre Macintosh PowerBook.

Eine Anleitung zum Einbau dieser Karte finden Sie in dem Handbuch, das Sie mit Ihrem Macintosh PowerBook erhalten haben.

Per istruzioni sull'installazione di questa scheda, consultare il Manuale Utente fornito con Macintosh PowerBook.

Instructies voor de installatie van deze kaart vindt u in de gebruikershandleiding bij uw Macintosh PowerBook.

Para obtener instrucciones sobre la instalación de esta tarjeta, consulte la guía del usuario que viene con el Macintosh PowerBook.

Instruktioner för hur du installerar det här kortet finns i handboken som följde med din Macintosh PowerBook.

Macintosh PowerBook
Expansion Card Installation
拡張カードのインストール

For Macintosh PowerBook 1400 series computers

Apple Computer, Inc.

Communications regulation information

FCC statement

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of FCC rules. See instructions if interference to radio or television reception is suspected.

Radio and television interference

The equipment described in this manual generates, uses, and can radiate radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with Apple's instructions—it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your computer system is causing interference by turning it off. If the interference stops, it was probably caused by the computer or one of the peripheral devices.

If your computer system does cause interference to radio or television reception, try to correct the interference by using one or more of the following measures:

■ Turn the television or radio antenna until the interference stops.

■ Move the computer to one side or the other of the television or radio.

■ Move the computer farther away from the television or radio.

■ Plug the computer into an outlet that is on a different circuit from the television or radio. (That is, make certain the computer and the television or radio are on circuits controlled by different circuit breakers or fuses.)

If necessary, consult an Apple-authorized service provider or Apple. See the service and support information that came with your Apple product. Or, consult an experienced radio/television technician for additional suggestions. You may find the following booklet helpful: *Interference Handbook* (stock number 004-000-00493-1). This booklet, prepared by the Federal Communications Commission, is available from the U.S. Government Printing Office, Washington, DC 20402.

IMPORTANT Changes or modifications to this product not authorized by Apple Computer, Inc., could void the FCC Certification and negate your authority to operate the product.

This product was tested for FCC compliance under conditions that included the use of Apple peripheral devices and Apple shielded cables and connectors between system components. It is important that you use Apple peripheral devices and shielded cables and connectors between system components to reduce the possibility of causing interference to radios, television sets, and other electronic devices. You can obtain Apple peripheral devices and the proper shielded cables and connectors through an Apple-authorized dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

DOC statement

DOC Class B Compliance This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Observation des normes—Classe B Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le ministre des Communications.

VCCI statement

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