

Gateway®



Service Guide

Gateway 450RGH Notebook

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Replacing Gateway 450RGH Components



The 450RGH notebook has a standard configuration, which does not include either the EZ Point pointing device or the fingerprint reader. In addition to the standard configuration, there are three optional configurations. Option 1 includes the standard configuration plus the EZ Point pointing device only. Option 2 includes the standard configuration plus the fingerprint reader only. Option 3 includes the standard configuration plus both the EZ Point pointing device and the fingerprint reader.

This service guide includes procedures for the pointing device and the fingerprint reader.

Important



This service guide is intended to be used only by an authorized service provider. It is not intended for individual users or consumers.

Use this service guide to help plan your maintenance tasks for the Gateway 450RGH notebook. All tasks covered in this guide can be performed by an **authorized field technician** without jeopardizing the notebook's warranty.

For information on the notebook's general maintenance, technical support, safety notices, and regulatory notices, see the Gateway user's guide.

If you have suggestions regarding the content of this guide, send an e-mail with the subject "Service Guide Comments" to channel.services@gateway.com.

Identifying the notebook model

The label on the bottom of the notebook contains information that identifies the notebook model and its features.

Gateway
model
number



FOR USE WITH ADP-90HB B or PA-1900-05
POUR UTILISER AVEC MODEL ADP-90HB B ou PA-1900-05
INPUT: 19V 4.74A

MODEL No.: 450R GH

This class B digital apparatus meets all requirements of the Canadian interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le Matériel brouilleur du Canada.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Apparatus Claims of U.S. Patent Nos. 4,631,603; 4,577,216; 4,819,098 and 4,907,093 licensed for limited viewing uses only.




CONFORMS TO
ANSI/UL STD. 1950
CERTIFIED TO
CAN/CSA STD
C22.2 NO. 950



3022713




Fitted with internal Askey Computer Corp.
modem model number 1456VQL1V-1(INT)
Complies with 47 CFR part 68
REN:0.08 US:H8NM500BL1V-1INT
Complies with Industry Canada
CS03 IC: 135311889 REN:0.0
MEX SCT: TTDAS1402-116




C.M-2

Caution

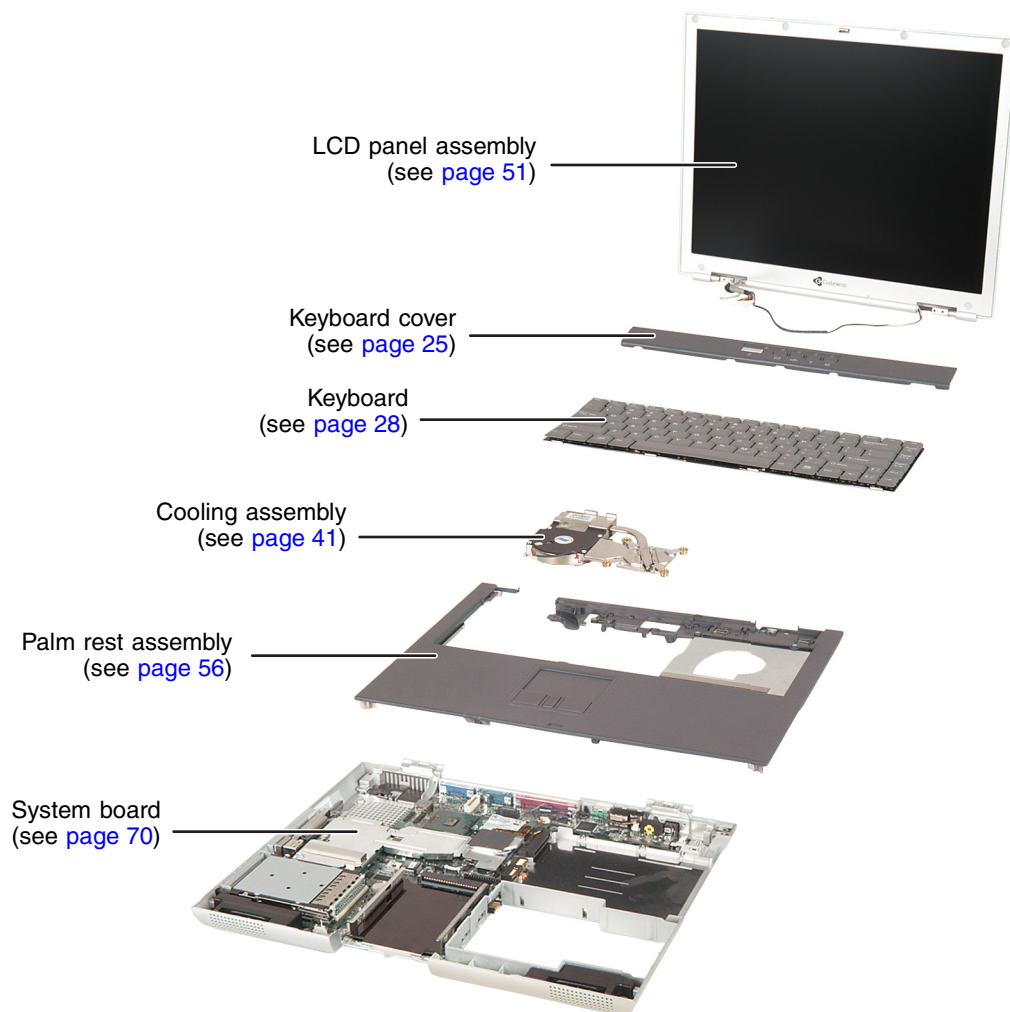


It is important that you use the correct service guide for the notebook. Failure to follow the approved tasks for the notebook model may result in damage to the notebook.

Identifying components

Where screw measurements are shown, the first number indicates screw head width, and the second number indicates screw length.

Use this chart to identify the main components of the notebook. For a complete list of replaceable parts, see the [Contents](#).



Preparing your work space

Before performing maintenance on the notebook, make sure that your work space and the notebook are correctly prepared.

- Wear a grounding (ESD) wrist strap, and use a grounded or dissipative work mat.
- Use a stable and strong table, and make sure that the table top is large enough to hold each component as you remove it.
- Use bright lighting to make part identification easier.
- Keep your work surface free from clutter and dust that may damage components.
- Use a magnetized screwdriver for removing screws.
- When removing components that are attached to the notebook by a cable, unplug the cable before removing the screws, when possible, to avoid damaging the cable.
- As you remove components and screws, lay them toward the rear of your work surface (behind the notebook) or far enough to the side that your arms do not accidentally brush them onto the floor.
- To help keep track of screws, try the following:
 - Place each component's screws in their own section of a parts sorter.
 - Place each component's screws next to the component on your work surface.
 - Print the first page of each task, then place the page toward the rear of your work surface. As you remove screws, place the screws in their respective boxes on the page. Where screw measurements are shown, the first number indicates screw head width, and the second number indicates screw length.
 - After loosening screws that are deeply recessed in a hole (for example, on the bottom of the base assembly), you can leave the screws in the holes if you place small pieces of masking tape over the hole openings. When reassembling the component, just remove the tape and tighten the screws.
 - When you place flat-headed screws on your work surface, stand them on their heads to prevent the screws from rolling off the table.

Preventing static electricity discharge

The components inside the notebook are extremely sensitive to static electricity, also known as *electrostatic discharge* (ESD).

Warning



To avoid exposure to dangerous electrical voltages and moving parts, turn off the notebook and unplug the power cord and modem and network cables before opening the case.

Caution



ESD can permanently damage electrostatic discharge-sensitive components in the notebook. Prevent ESD damage by following ESD guidelines every time you open the notebook case.

Before replacing components, follow these guidelines:

- Turn off the notebook.
- Wear a grounding wrist strap (available at most electronics stores) and attach it to a bare metal part of your workbench or other grounded connection.

Warning



To prevent risk of electric shock, do not insert any object into the vent holes of the notebook.

- Touch a bare metal surface on your workbench or other grounded object.
- Unplug the power cord and the modem and network cables.
- Remove the main battery. For more information, see [“Removing the main battery” on page 8](#).
- Disconnect all peripheral devices and remove any PC Cards.

Before working with notebook components, follow these guidelines:

- Avoid static-causing surfaces such as carpeted floors, plastic, and packing foam.
- Remove components from their antistatic bags only when you are ready to use them. Do not lay components on the outside of antistatic bags because only the inside of the bags provide electrostatic protection.
- Always hold components by their edges. Avoid touching the edge connectors. Never slide components over any surface.

Preparing the notebook

Warning

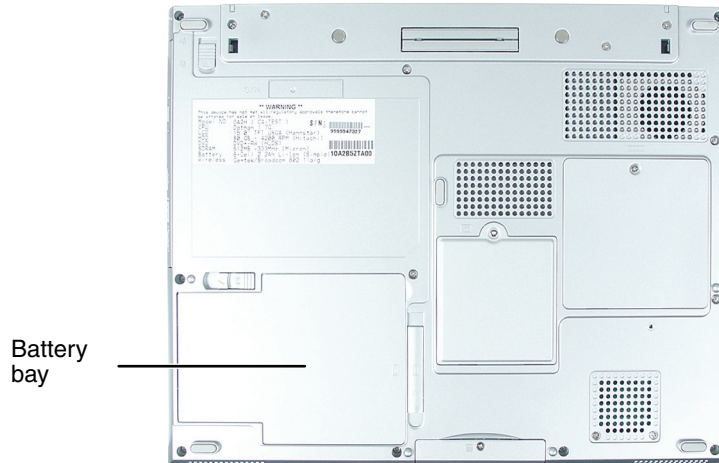


To avoid exposure to dangerous electrical voltages and moving parts, turn off the notebook, remove the main and optional secondary batteries, and unplug the power cord and modem and network cables before opening the case. Replace the cover before you restore power or reconnect the modem and network cables.

To prepare the notebook for maintenance:

- Follow all ESD recommendations.
- Make sure that the modular drive is empty.
- Disconnect all peripheral devices and remove any PC Cards.
- Turn off the notebook and unplug the power cord and modem and network cables (if attached).

Removing the main battery



To remove the main battery:

- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in ["Preparing the notebook" on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Slide the battery release latch.



- 4 Lift the battery out of the bay.



Replacing the modular bay component

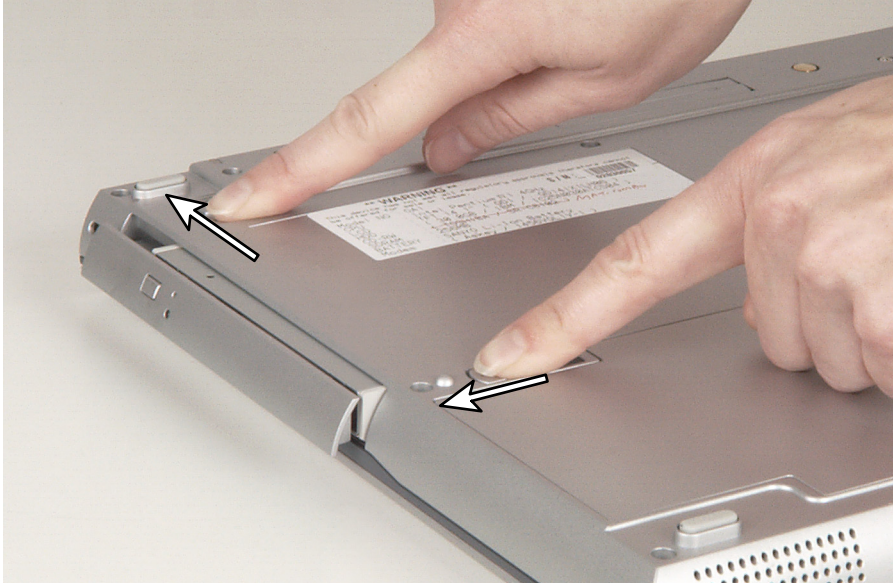
The modular bay on the notebook is hot-swappable and holds one of the following components:

- CD drive
- DVD drive
- Memory card reader
- Secondary battery

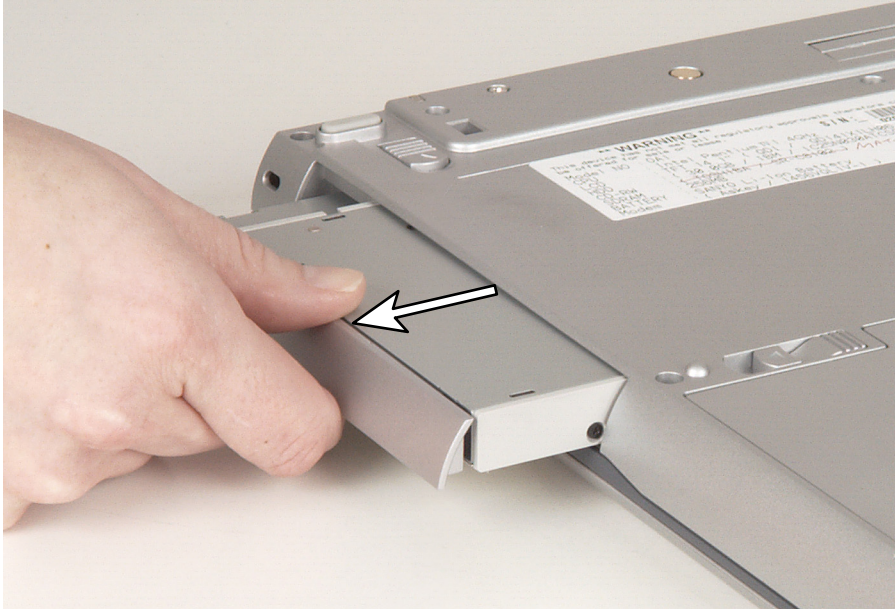
To determine the type of drive in a bay, examine the logo on drive tray's plastic cover. The logo identifies the drive in the modular bay.

To remove the modular bay component:

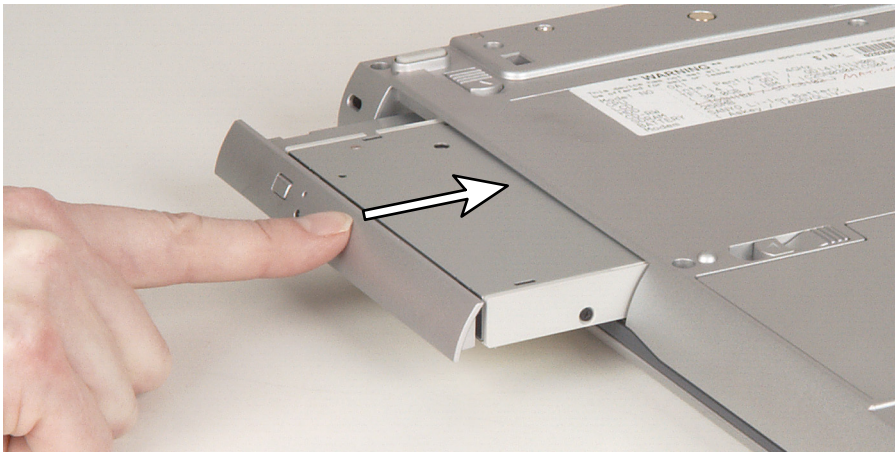
- 1** If a drive module is in the bay, make sure that the drive is empty.
- 2** Turn the notebook over so the bottom is facing up.
- 3** Slide and hold the modular bay latch closest to the back of the notebook.
- 4** Slide the other modular bay release latch. The component moves out slightly.



- 5** Slide out the modular bay component.



- 6** Slide in the new modular bay component.



Adding or replacing memory modules

Tools you need to complete this task:

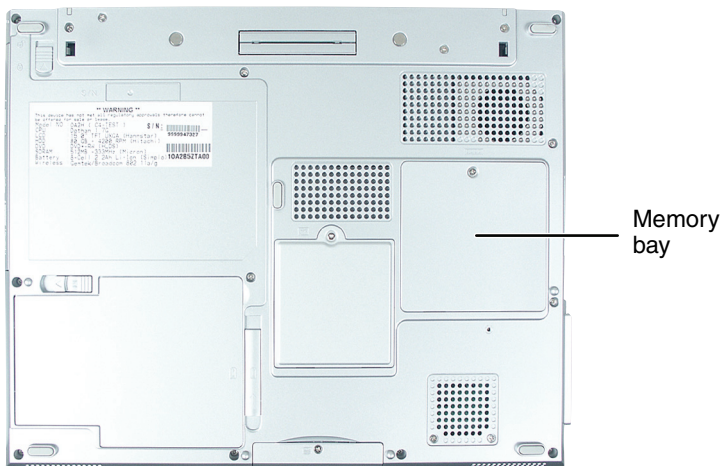


Phillips #0 screwdriver

Important



Use only memory modules designed for the Gateway 450RGH.



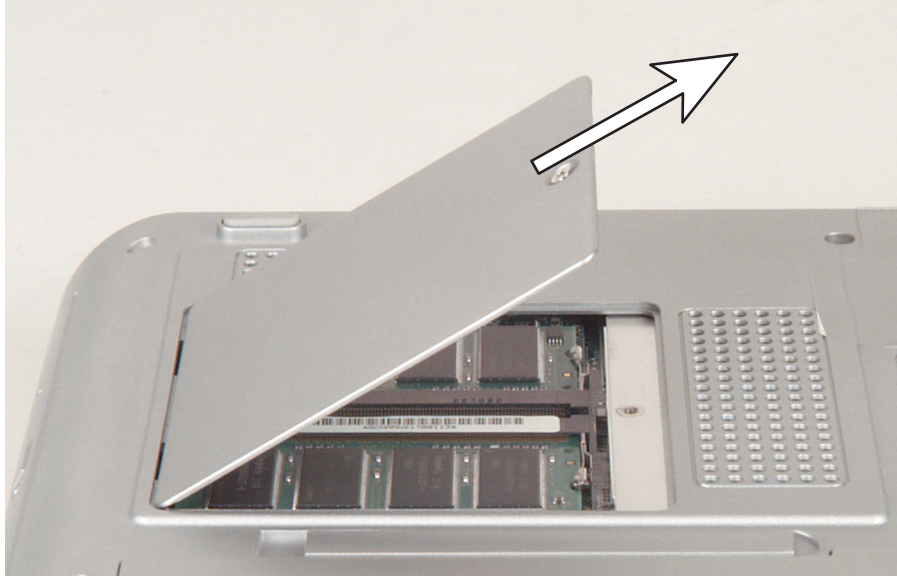
Memory bay



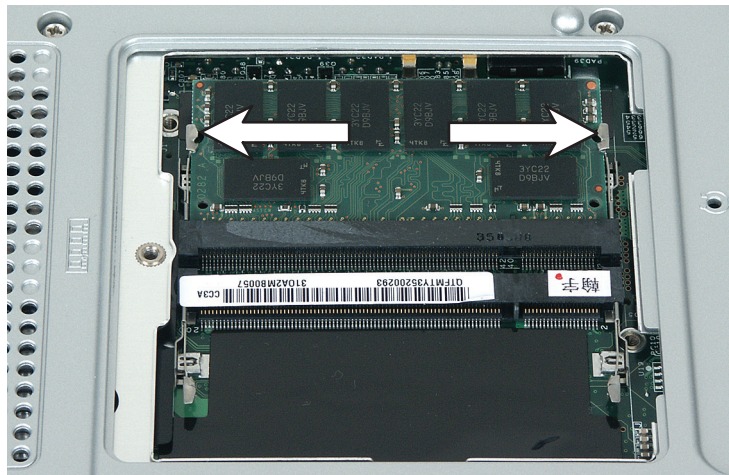
To add or replace memory modules:

- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5 Loosen the captive screw that secures the memory cover. (The screw cannot be removed.)

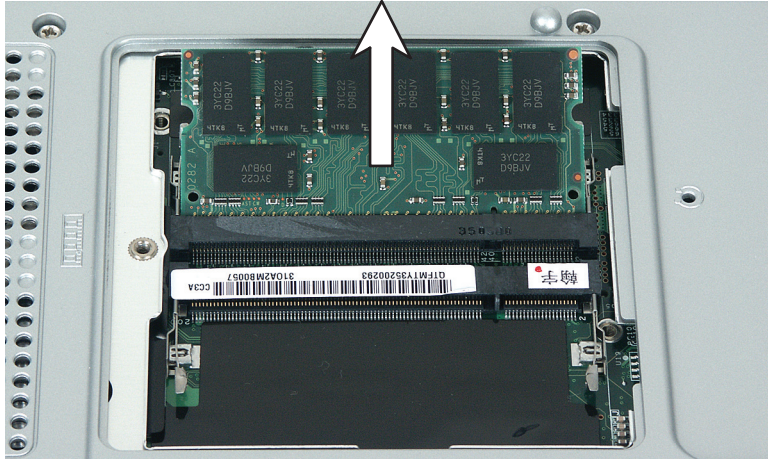
- 6** Lift the screw side of the cover upward, then slide the cover out.



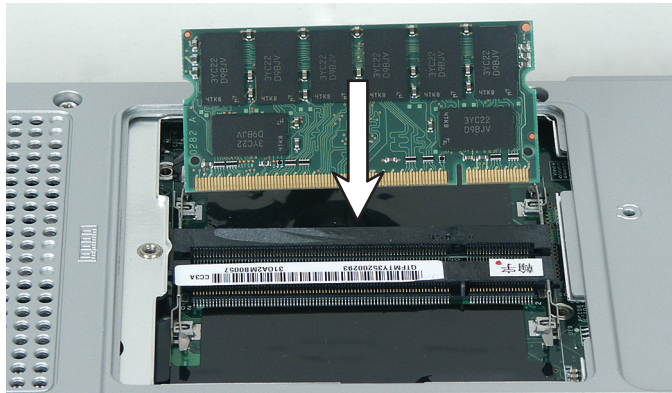
- 7** If you are removing a module, gently press outward on the clip at each end of the memory module until the module tilts upward.



- 8** Pull the memory module out of the slot.



- 9** Hold the new or replacement module at a 30-degree angle and press it into the empty memory slot. This module is keyed so it can only be inserted in one direction. If the module does not fit, make sure that the notch in the module lines up with the tab in the memory slot.



- 10** Gently push the module down until it clicks in place.
- 11** Replace the memory bay cover and tighten the cover screw.
- 12** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



Replacing the IEEE 802.11 Mini PCI card

Caution



By law, only approved wireless modules provided by Gateway, or a Gateway authorized representative, explicitly for the Gateway 450RGH may be installed in this notebook.

Caution



Legal requirements dictate that a security screw (or other means) be used to attach the mini-PCI cover to the chassis in a manner that restricts end user access. End users are strictly prohibited from having access to the wireless card. Due to manufacturing process changes, Gateway 450RGH notebooks manufactured after August 7, 2003 require a Torx head security screw to attach the mini-PCI cover.

Caution



Legal requirements dictate the mini-PCI cover be in place during any and all operation of the notebook's wireless feature.

Tools you need to complete this task:



Torx T8 screwdriver



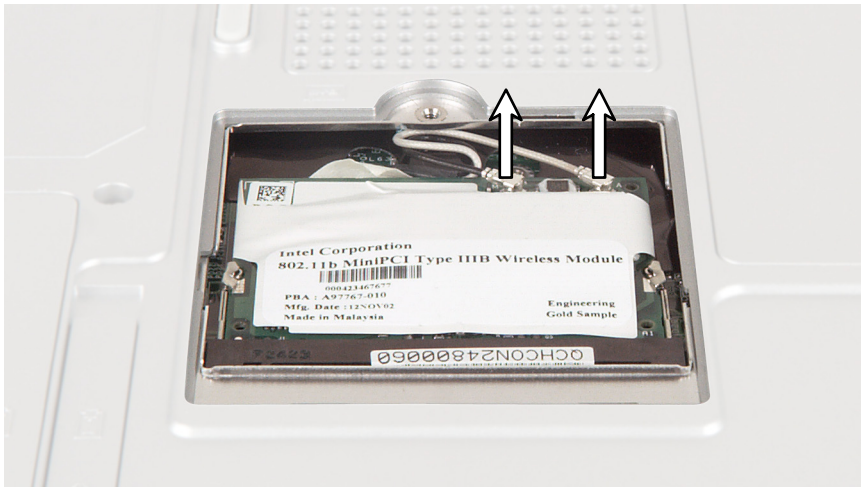
To replace the IEEE 802.11 Mini PCI card:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Loosen the captive Torx screw that secures the mini PCI cover. (The screw cannot be removed.)

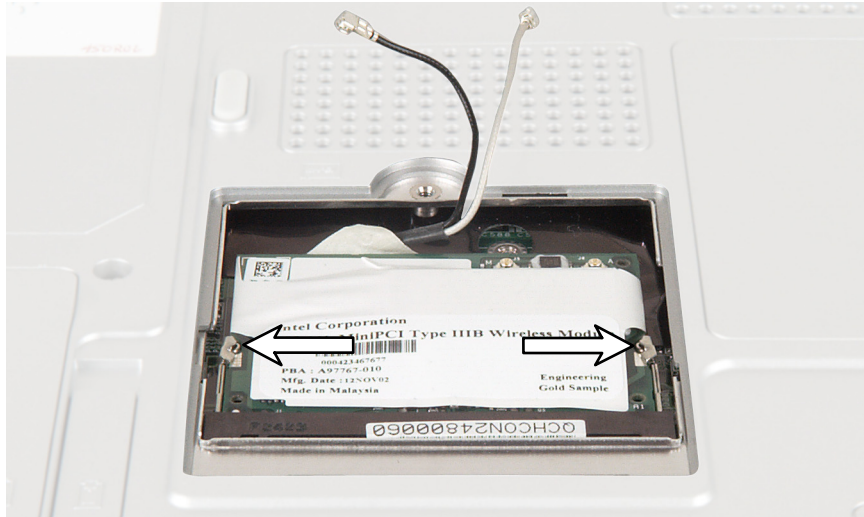
- 6** Lift the screw side of the cover upward, then slide the cover out.



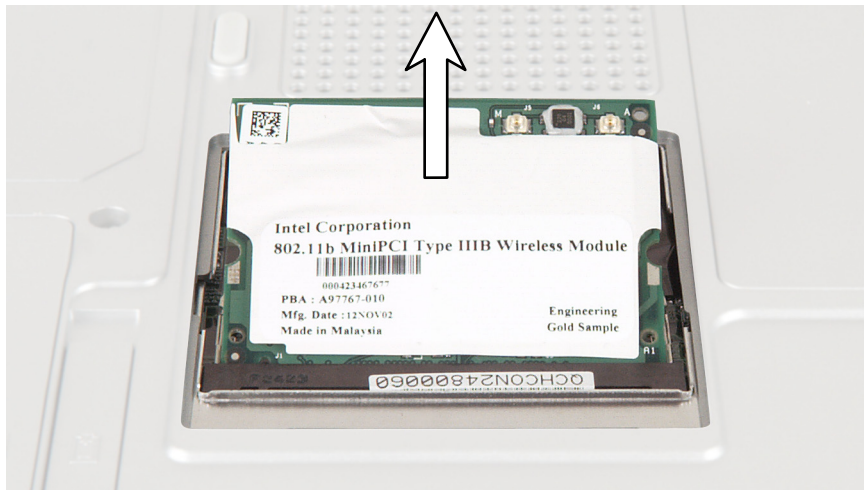
- 7** Unplug the two antenna cables.



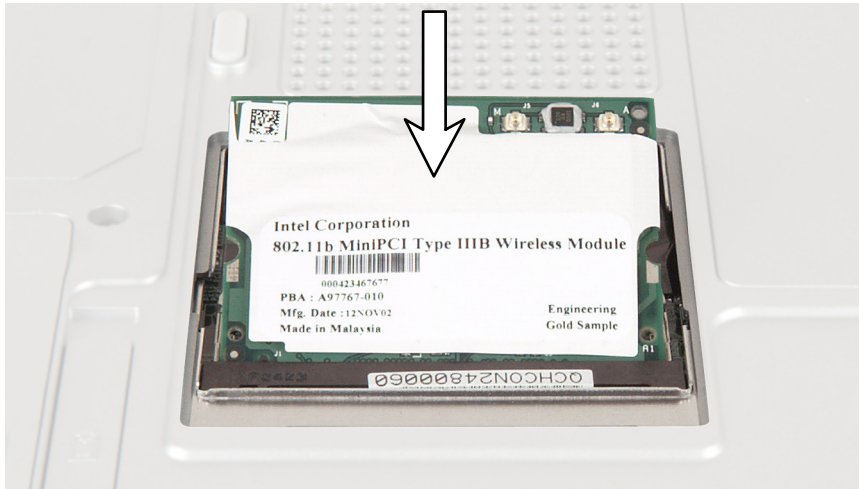
- 8** Move the antenna wires out of the way, then press outward on the clip at each side of the module until the module tilts upward.



- 9** Pull the module out of the slot.



- 10** Hold the new module at a 30-degree angle and press it into the empty slot. This module is keyed so it can only be inserted in one direction. If the module does not fit, make sure that the notch in the module lines up with the tab in the module slot.



- 11** Move the antenna wires out of the way, then press the module down until it clicks into place.
- 12** Reattach the black antenna cable to the connector labelled MAIN or M, then reattach the light gray antenna cable to the connector labelled AUX or A.
- 13** Replace the mini PCI cover, then tighten the captive screw.
- 14** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



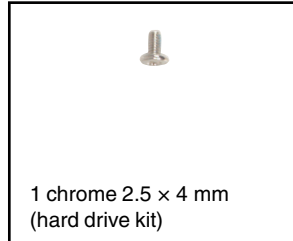
Replacing the hard drive kit

Tools you need to complete this task:

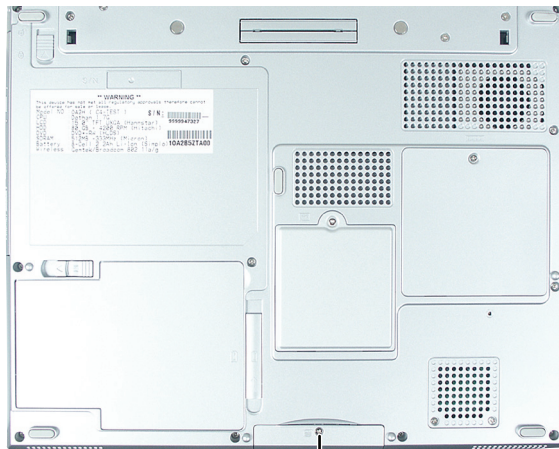


Phillips #0 screwdriver

Screws removed during this task:



1 chrome 2.5 × 4 mm
(hard drive kit)



Hard Drive

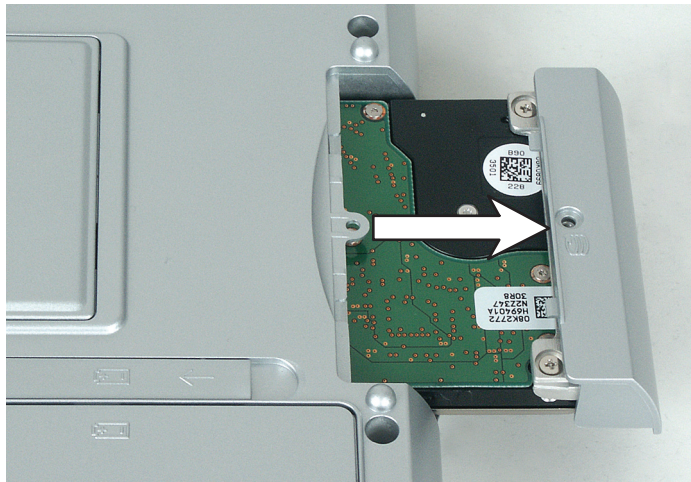
To replace the hard drive kit:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).

- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component”](#) on page 10.
- 5 Remove the hard drive kit screw.



- 6 Slide the old hard drive kit out of the notebook.



- 7 If replacing the hard drive in the hard drive kit, replace the hard drive by following the instructions in [“Replacing the hard drive in the hard drive kit”](#) on page 22.
- 8 Slide the new hard drive kit into the notebook.

- 9 Replace the screw that secures the hard drive kit to the notebook.
- 10 Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



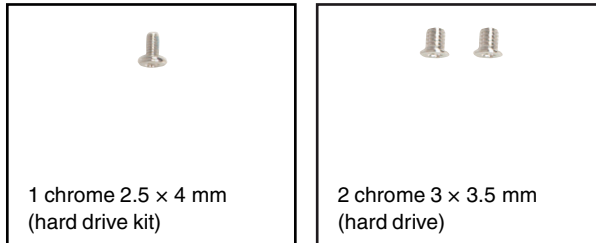
Replacing the hard drive in the hard drive kit

Tools you need to complete this task:



Phillips #0 screwdriver

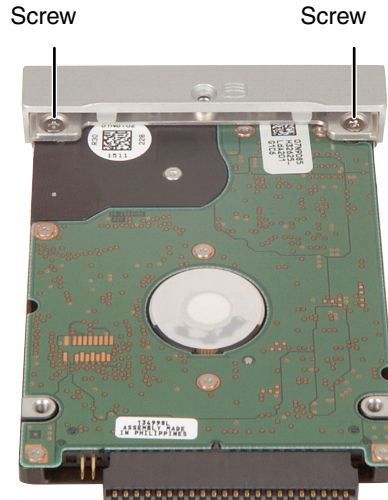
Screws removed during this task:



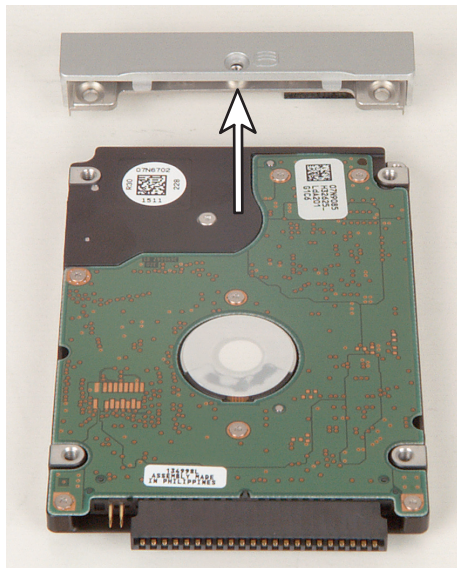
To replace the hard drive in the hard drive kit:

- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5 Remove the hard drive kit by following the instructions in [“Replacing the hard drive kit” on page 19](#).

- 6** Remove the two screws that secure the hard drive to the hard drive kit bracket.



- 7** Remove the bracket from the old drive.



- 8** Insert the new drive into the bracket so the screw holes line up.
- 9** Replace the two screws that secure the bracket to the drive.
- 10** Slide the new hard drive kit into the notebook.

- 11** Replace the screw that secures the hard drive kit to the notebook.
- 12** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



Replacing the keyboard cover

Tools you need to complete this task:



To replace the keyboard cover:

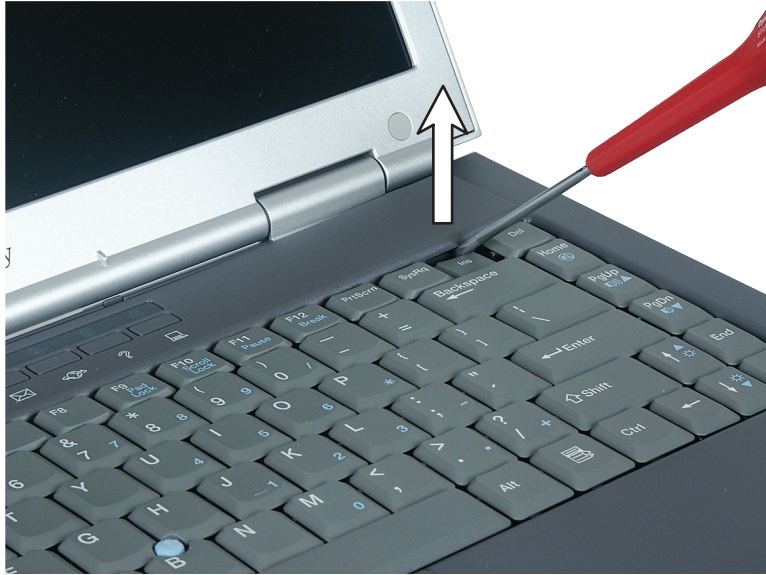
- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Turn the notebook over so the top is facing up.
- 6** Open the LCD panel to the normal viewing position.

- 7 Insert the small flat-blade screwdriver or non-marring tool under the bottom-right corner of the keyboard bezel and gently pry it up.

Important



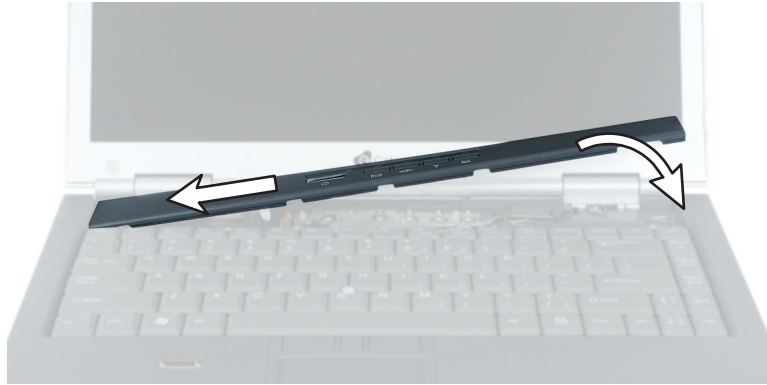
Inserting a piece of cloth between the screwdriver and keyboard and notebook case will help prevent damage to the notebook.



- 8 Pull the bezel off the notebook. You will hear small snapping sounds as the bezel comes away from the notebook. Be careful not to break off the tabs found on the left end of the bezel.



- 9 Slide the two tabs of the new cover on the left end of the bezel under the notebook frame.



- 10 Press down on the bezel in several places until it clicks in place.

The bezel is correctly mounted when you can run your finger along the bezel and find no loose spots. The bezel should be flat all the way across.

Caution



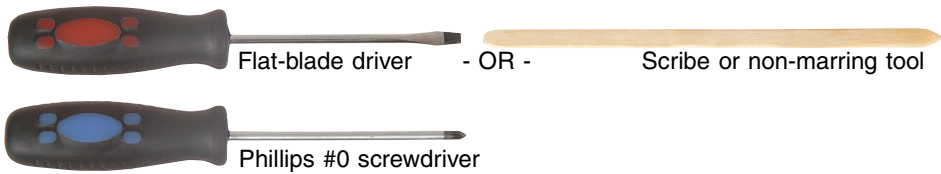
If the bezel is not correctly replaced, the notebook could be damaged when you try to close the LCD panel.

- 11 Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

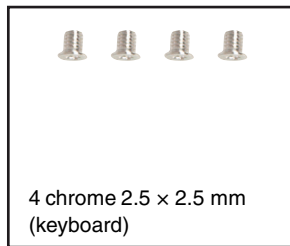


Replacing the keyboard

Tools you need to complete this task:



Screws removed during this task:



To replace the keyboard:

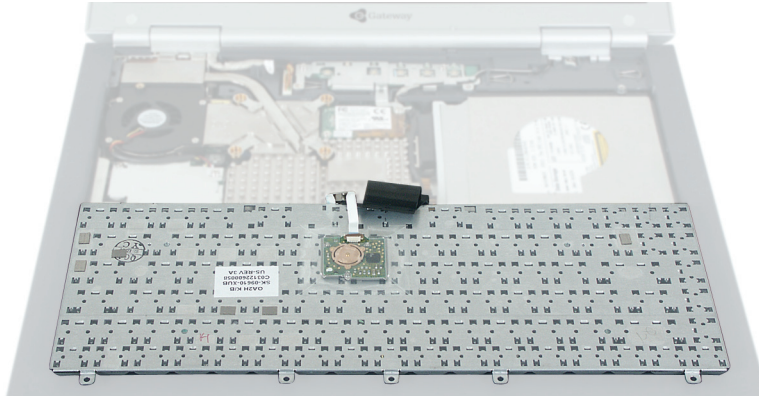
- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5 Turn the notebook over so the top is facing up.

- 6 Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover”](#) on page 25.
- 7 With a small Phillips screwdriver, remove the four keyboard screws.

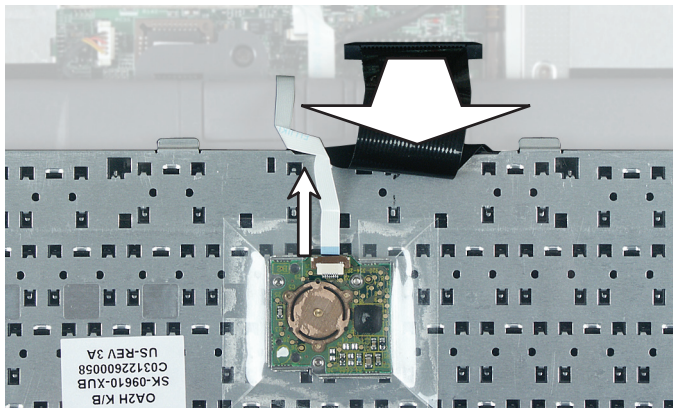
Screws



- 8 Lift the back edge of the keyboard, then slowly rotate it toward you so it lies **keys-down** on top of the notebook. Be careful not to damage the LCD panel.



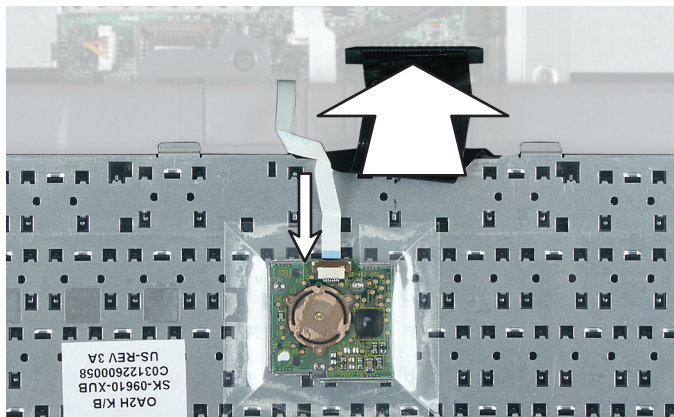
- 9 Squeeze the ends of the keyboard connector using two fingers, then lift to remove the black keyboard cable. Be careful not to touch or damage any other components.



- 10 If the notebook has the optional EZ Point pointing device, carefully lift the silver contact on the back of the keyboard where the white EZ Point pointing device cable connects to the keyboard. Gently lift the cable away from the connector. The cable is now free and you can remove the keyboard.
- 11 Place the new keyboard **keys-down** on the notebook with the space bar away from you.
- 12 Squeeze the ends of the keyboard connector plug on the end of the black keyboard cable using two fingers, then insert the plug into the keyboard connector to attach the black keyboard cable. Be careful not to touch or damage any other components.

Important

The outside of the keyboard plug goes around the keyboard connector. The plug is correctly oriented if the cable is not twisted.



- 13 If the notebook has the optional EZ Point pointing device, insert the white cable for the pointing device into the cable connector on the back of the keyboard. Make sure that the blue print is facing up and the silver contacts are facing downward, then press down gently on the cable connector to lock it into place.
- 14 Rotate the keyboard toward the LCD panel until the keyboard is almost face-up.

- 15** Insert the tabs on the front of the keyboard under the palm rest.



- 16** Gently press the keyboard down until it is flat all the way across. The keyboard should easily fall into place. Be careful not to damage the LCD panel.
- 17** Replace the four keyboard screws.
- 18** Reassemble the notebook.
- 19** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

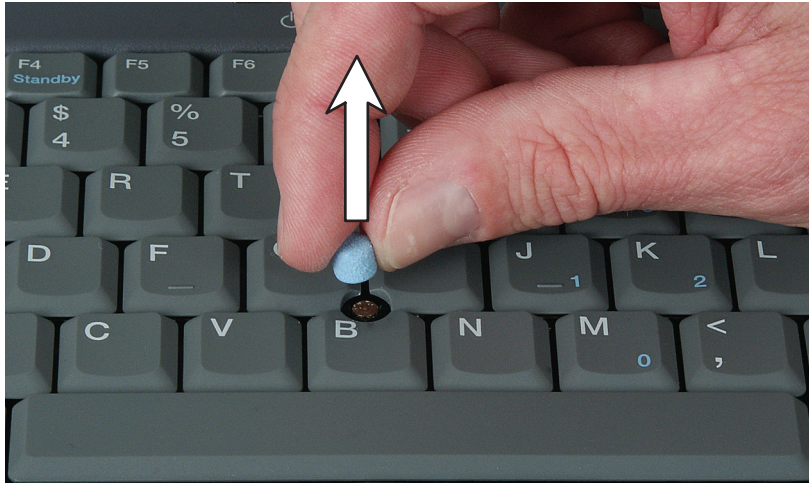


Replacing the EZ Point pointing device cap

To replace the cap on the EZ Point pointing device, use the following procedure. To replace the entire EZ Point pointing device assembly, replace the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).

To replace the EZ Point pointing device cap:

- 1 Remove the cap from the stick.

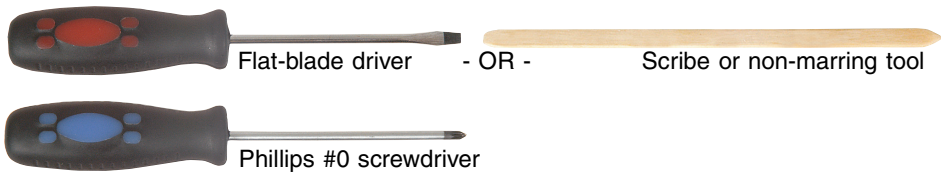


- 2 Align the new cap over the stick and press it into place.

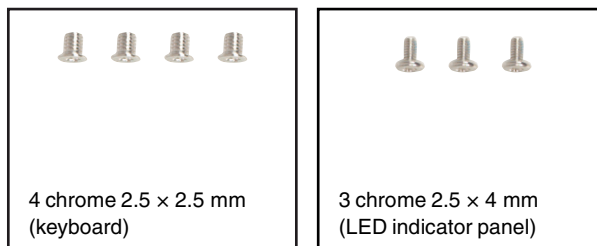


Replacing the LED indicator panel

Tools you need to complete this task:



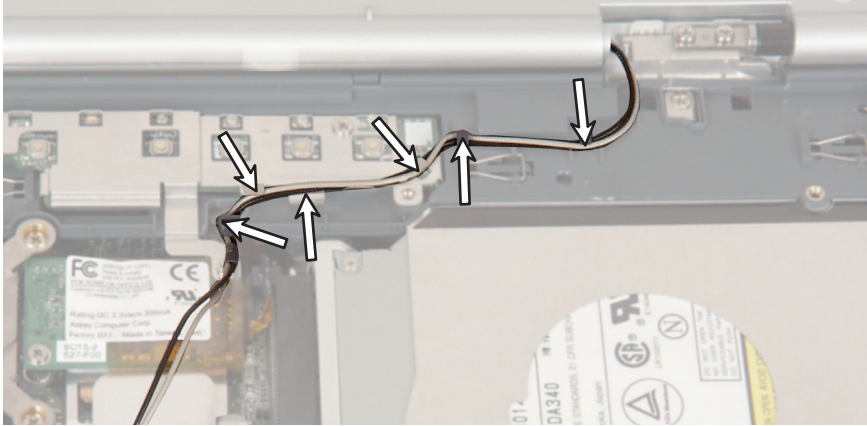
Screws removed during this task:



To replace the LED indicator panel:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Turn the notebook over so the top is facing up.
- 6** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).

- 8 If the notebook has IEEE 802.11 wireless networking built in, slide the antenna cables away from the LED indicator panel EMI shielding.



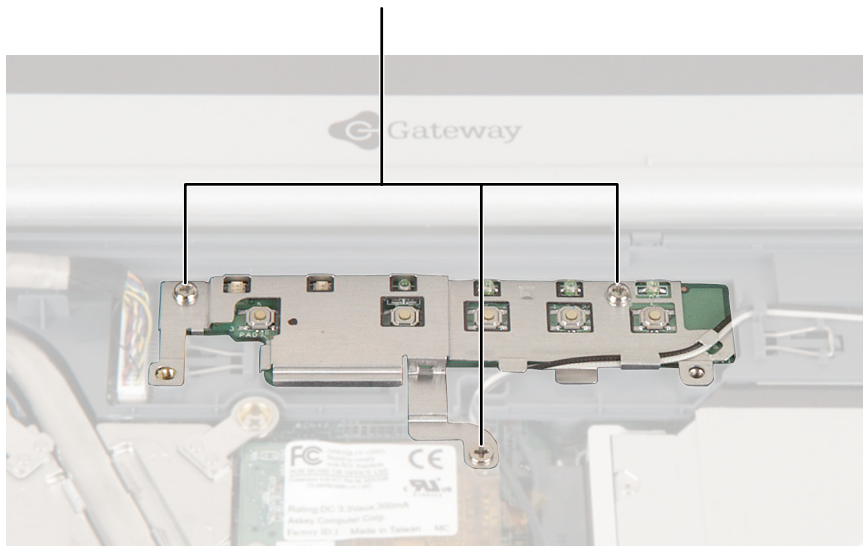
- 9 Remove the three screws that secure the LED indicator panel shield to the notebook.

Caution



The bottom screw also secures the cable for the modem and the grounding wire for the wireless networking antenna cables. Be careful not to damage the connectors or the wires when removing this screw.

Screws



- 10** Insert the small flat-blade screwdriver or non-marring tool under the left side of the indicator panel and gently pry it up about ¼-inch, then lift the entire panel from the notebook.



- 11** Carefully lift the middle of the silver EMI panel shielding slightly away from the panel, then lift the ends slightly, then repeat until the shielding pulls completely free.

Caution



The LED panel's metal shielding is very thin and will break if you bend it too much. Be careful when handling the EMI panel shielding.

- 12** Align the new indicator panel screw holes with the holes on the notebook, then press the panel into place.
- 13** Carefully replace the indicator panel shielding.
- 14** Replace the two top screws that secure the LED indicator panel to the notebook.
- 15** Align the connectors for the modem cable and antenna cables on the third screw, then replace the screw to secure the LED indicator panel shield to the notebook.

Caution



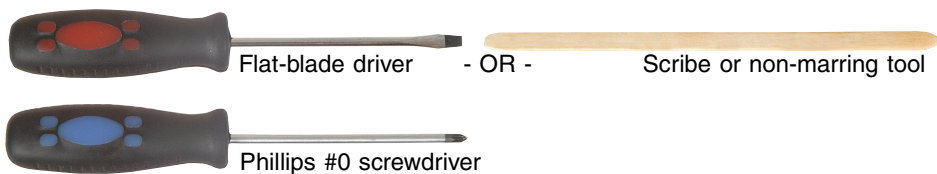
The bottom screw also secures the cable for the modem and the grounding wire for the wireless networking antenna cables. Be careful not to damage the connectors or the wires when installing this screw.

- 16** Rethread the antenna cables (if applicable).
- 17** Reassemble the notebook. Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

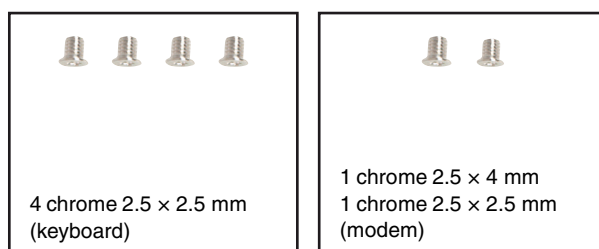


Replacing the modem

Tools you need to complete this task:



Screws removed during this task:



To replace the modem:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Turn the notebook over so the top is facing up.
- 6** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).

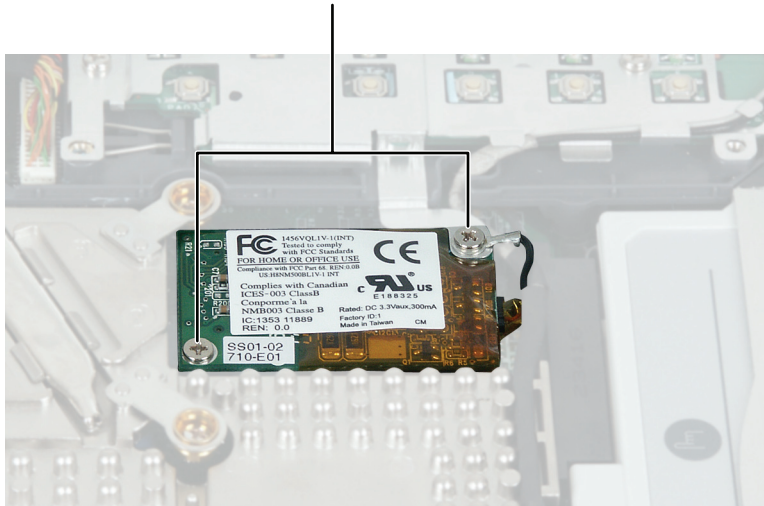
- 8 Remove the two screws that secure the modem to the notebook.

Caution

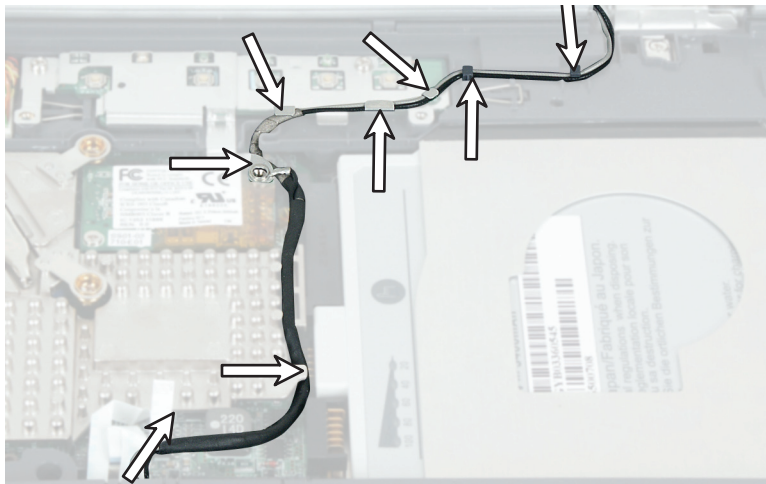


The upper-right screw also secures the bottom of the LED indicator panel and the grounding wire for the wireless networking antenna cables. Be careful not to damage the connectors or the wires when removing this screw.

Screws



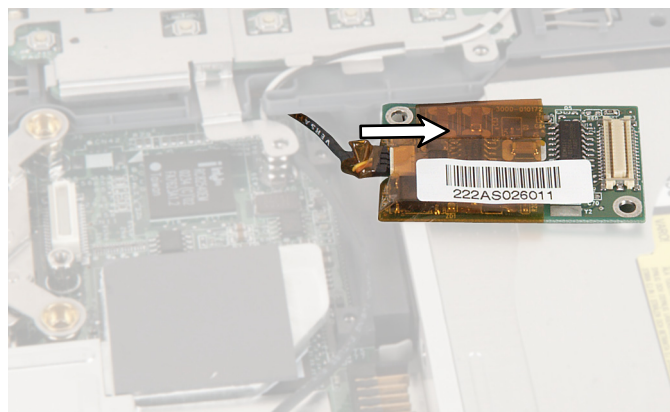
- 9 If the notebook has IEEE 802.11 wireless networking built in, slide the antenna cables away from the LED indicator panel EMI shielding.



- 10** Insert the small flat-blade screwdriver or non-marring tool under the left side of the modem and gently pry it up about ¼-inch.



- 11** Slide the modem toward you until it slides out from under the LED indicator panel EMI shielding.
- 12** Unplug the modem cable from the modem.



- 13** Connect the modem cable into the new modem.
- 14** Slide the modem under the LED indicator panel EMI shielding, align the modem screw holes with the holes on the notebook, then press the modem into place.

- 15** Replace the shorter of the two modem screws to secure the lower-left corner of the modem to the notebook.
- 16** Align the connectors for the modem cable and the grounding wire for the antenna cables on the longer of the two modem screws, then secure the modem to the notebook through the LED indicator panel shielding.

Caution



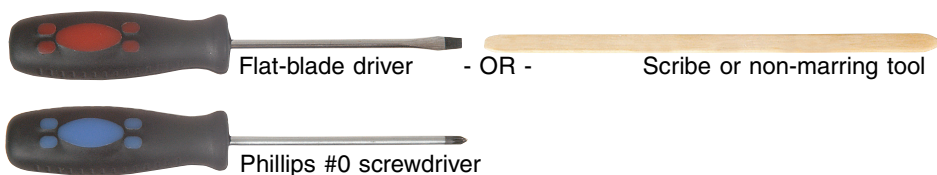
The upper-right screw also secures the bottom of the LED indicator panel and the grounding wire for the wireless networking antenna cables. Be careful not to damage the connectors or the wires when installing this screw.

- 17** Rethread the antenna cables (if applicable).
- 18** Reassemble the notebook.
- 19** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

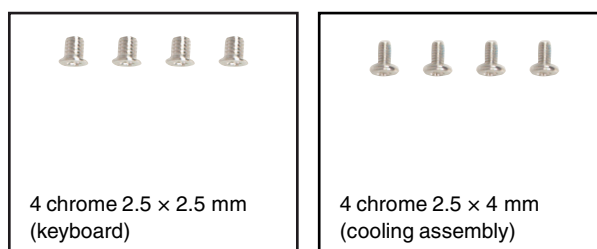


Replacing the cooling assembly

Tools you need to complete this task:



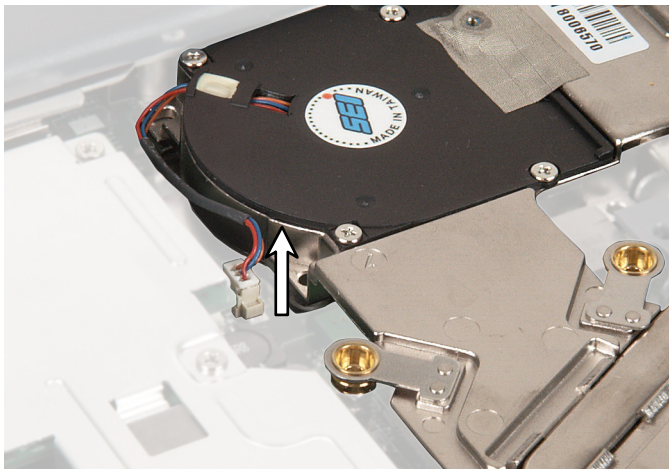
Screws removed during this task:



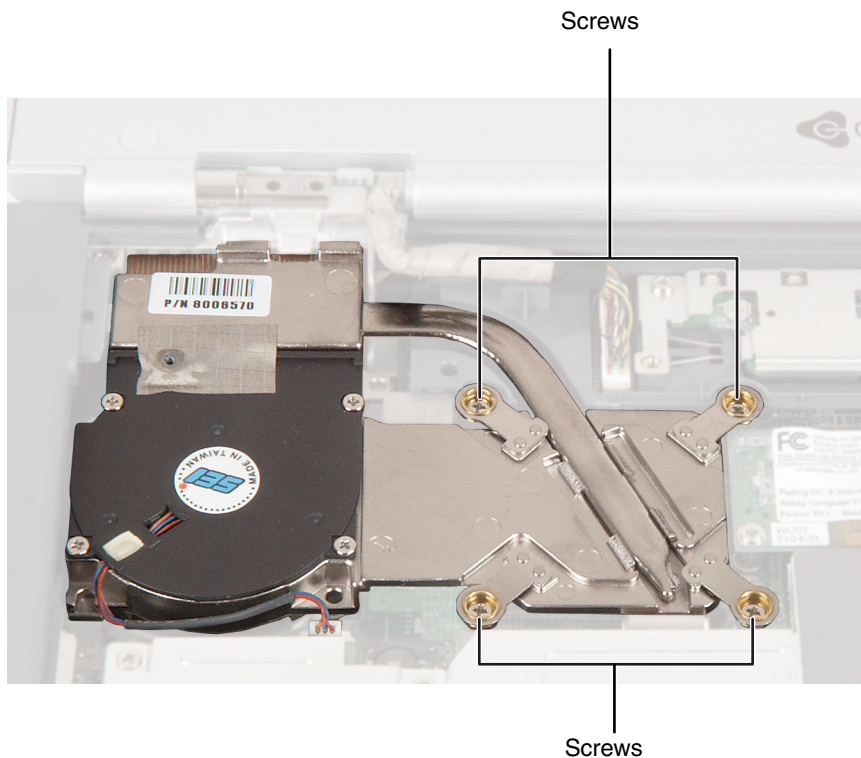
To replace the cooling assembly:

- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5 Turn the notebook over so the top is facing up.
- 6 Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7 Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).

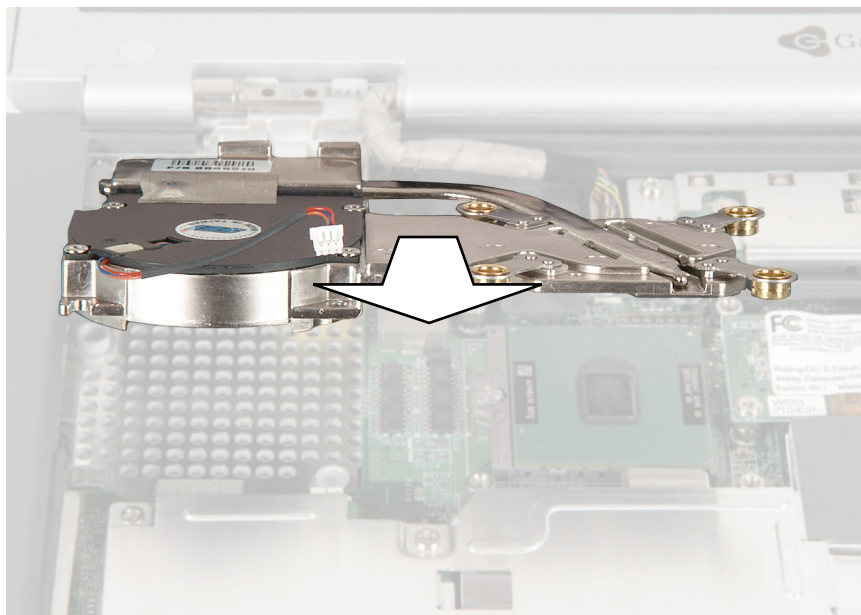
- 8 Unplug the cooling fan.



- 9 Remove the four screws that secure the cooling assembly to the notebook.



- 10** At the same time as you lift, move the cooling assembly to the front of the notebook and remove it.

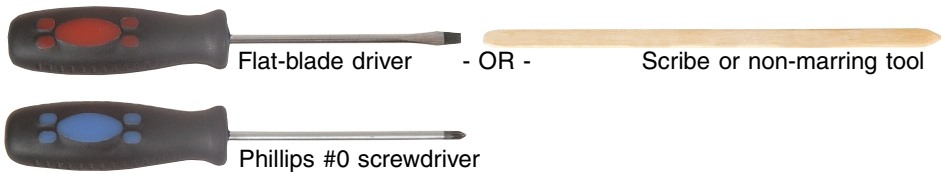


- 11** Insert the new cooling assembly into the notebook.
- 12** Replace the four cooling assembly screws.
- 13** Plug in the cooling fan.
- 14** Reassemble the notebook.
- 15** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

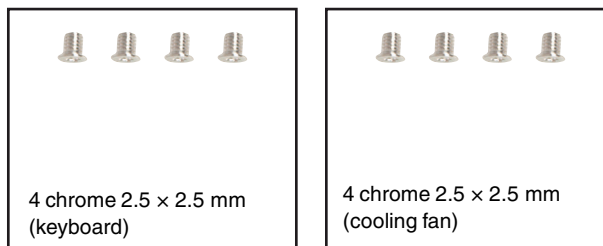


Replacing the cooling fan

Tools you need to complete this task:



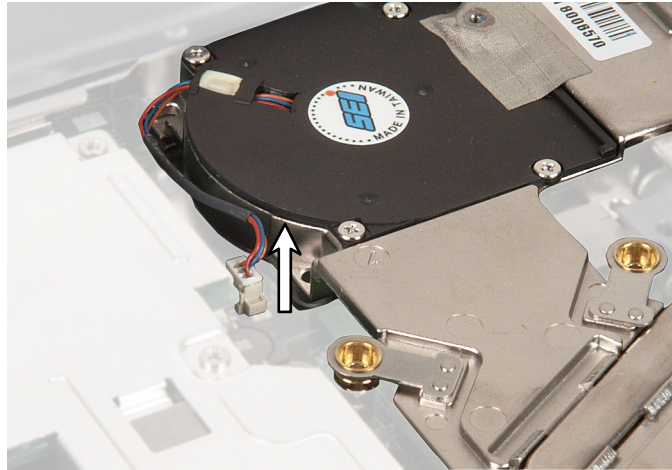
Screws removed during this task:



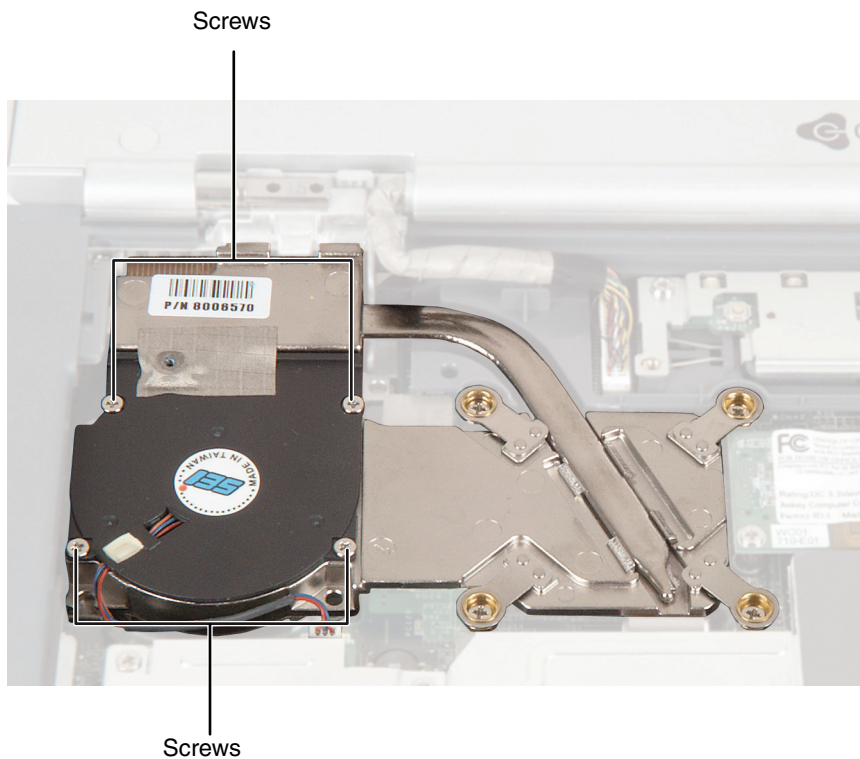
To replace the cooling fan:

- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.
- 3 Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4 If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5 Turn the notebook over so the top is facing up.
- 6 Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7 Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).

- 8** Unplug the cooling fan.



- 9** Remove the four screws that secure the cooling fan to the cooling assembly.



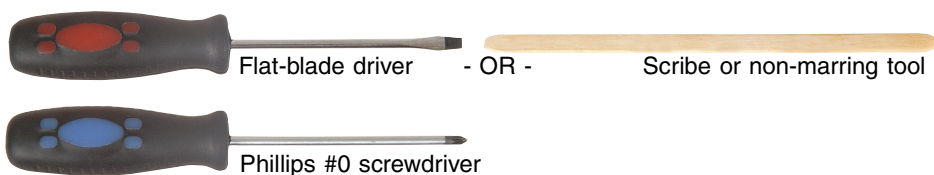
- 10** Lift the cooling fan from the cooling assembly and remove it.

- 11** Insert the new cooling fan into the cooling assembly.
- 12** Replace the four fan screws.
- 13** Plug in the cooling fan.
- 14** Reassemble the notebook.
- 15** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

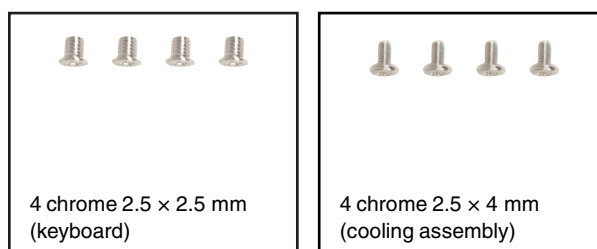


Replacing the processor

Tools you need to complete this task:



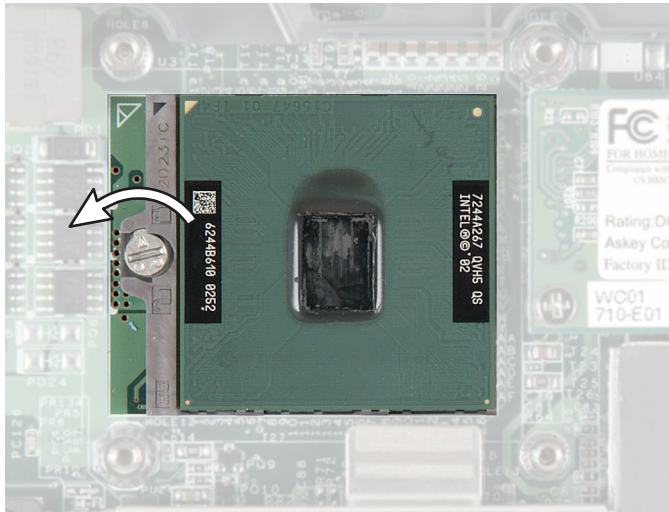
Screws removed during this task:



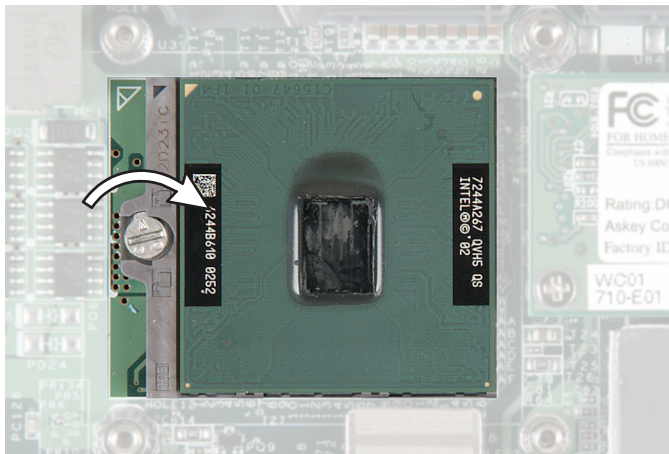
To replace the processor:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Turn the notebook over so the top is facing up.
- 6** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 8** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).

- 9** Use a flat-blade screwdriver to turn the processor lock screw ¼-turn counter-clockwise, then remove the processor from the old system board.



- 10** Install the processor onto the new system board making sure that Pin 1 on the processor (indicated by the silk-screened arrow on the corner of the processor) aligns with Pin 1 on the processor socket (indicated by the absence of a pin hole in the processor socket). Lock the processor in place by using a flat-blade screwdriver to turn the processor lock screw ¼-turn clockwise.

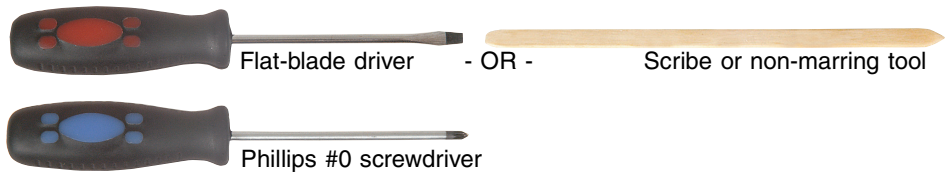


- 11** Reassemble the notebook. Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

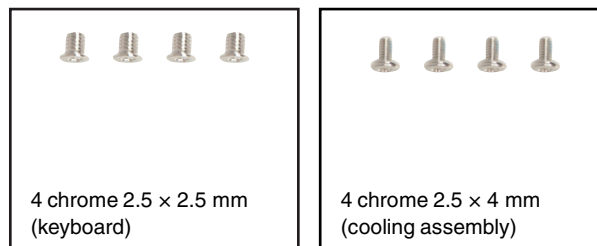


Replacing the hinge covers

Tools you need to complete this task:



Screws removed during this task:



To replace the hinge covers:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** Turn the notebook over so the top is facing up.
- 6** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 7** If you are replacing the left hinge cover, go to [Step 8](#).

-OR-

If you are replacing only the right hinge cover, go to [Step 10](#).

- 8** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 9** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 10** Open the LCD panel all the way, so it lies flat on the table.
- 11** Insert the small flat-blade screwdriver or non-marring tool under the bottom of the hinge covers, then carefully pry them up.

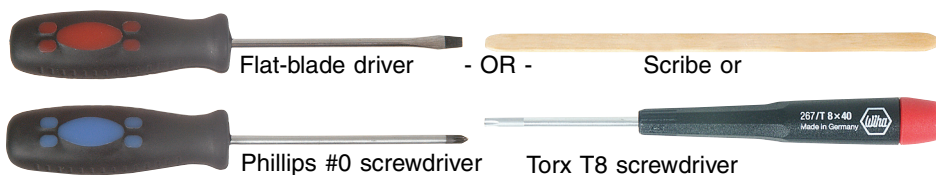


- 12** Snap the new covers into place over the hinges.
- 13** Reassemble the notebook.
- 14** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

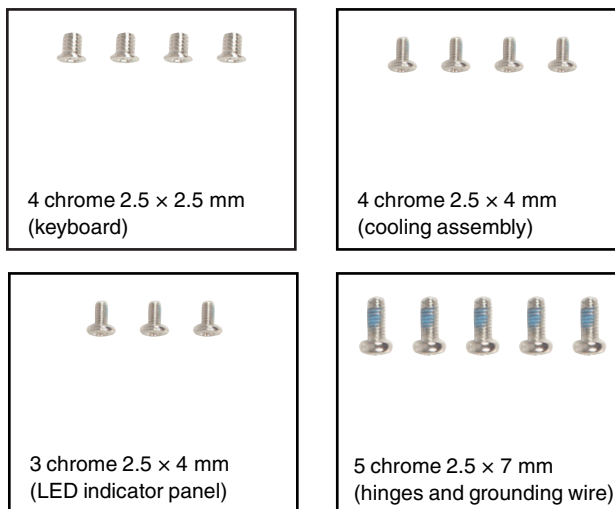


Replacing the LCD panel assembly

Tools you need to complete this task:



Screws removed during this task:



To replace the LCD panel assembly:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook”](#) on page 7.
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery”](#) on page 8.
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component”](#) on page 10.

- 5** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15.](#)
- 6** Turn the notebook over so the top is facing up.
- 7** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25.](#)
- 8** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28.](#)
- 9** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34.](#)
- 10** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41.](#)
- 11** Remove both hinge covers by following the instructions in [“Replacing the hinge covers” on page 49.](#)
- 12** Remove the four hinge screws that secure the LCD panel to the notebook.

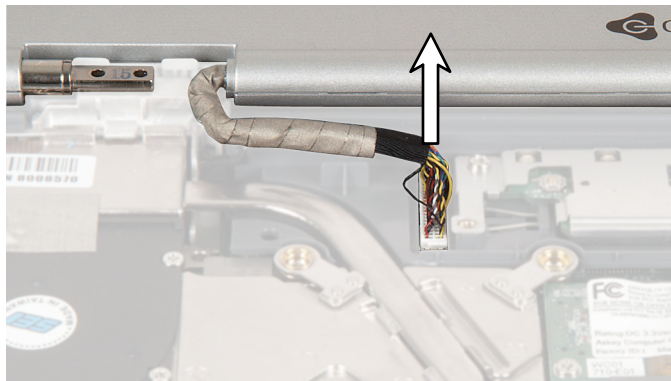


- 13 Use a flat-blade screwdriver or chip puller to carefully unplug the LCD video cable from the notebook. Make sure you grasp the connector, not the cable.

Caution



The connector is fragile. When using a flat-blade screwdriver to remove the connector, pry up one side slightly, then pry up the other side slightly. Continue alternating from side-to-side until the connector comes loose.



- 14 Loosen the screw securing the LCD panel video grounding wire, then lift the LCD panel grounding wire to remove the screw.

LCD panel video grounding screw



- 15** If the notebook has IEEE 802.11 wireless networking built in, loosen the screw holding the antenna grounding wire, then lift the antenna grounding wire to remove the screw.

Antenna grounding screw



- 16** Carefully pull the detached antenna cables up through the hole in the system board near the touchpad.

Caution



The connectors may catch on the system board hole. Be careful not to break the connectors off the antenna cables.

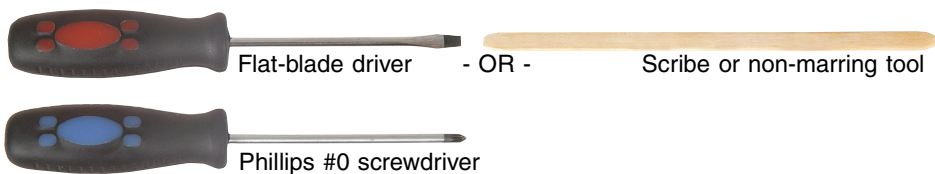
- 17** Lift the LCD panel away from the notebook. The LCD panel assembly is now completely detached from the notebook.
- 18** Place the new LCD panel assembly onto the notebook, then replace the four hinge screws.
- 19** Reattach the LCD panel grounding cable and secure with the screw.
- 20** Thread the antenna cables through the guides on the LED indicator panel shielding, then through the hole in the system board.
- 21** Reattach the antenna grounding cable and secure with the screw.

- 22** Plug the LCD video cable into the notebook.
- 23** Reassemble the notebook.
- 24** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

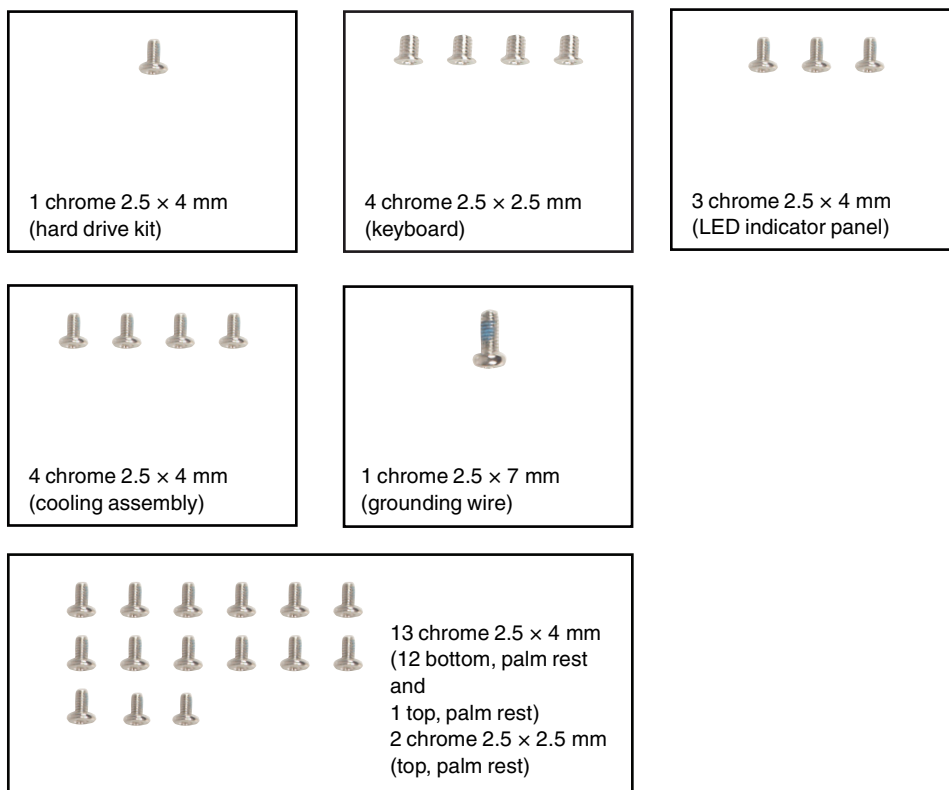


Replacing the palm rest assembly

Tools you need to complete this task:



Screws removed during this task:

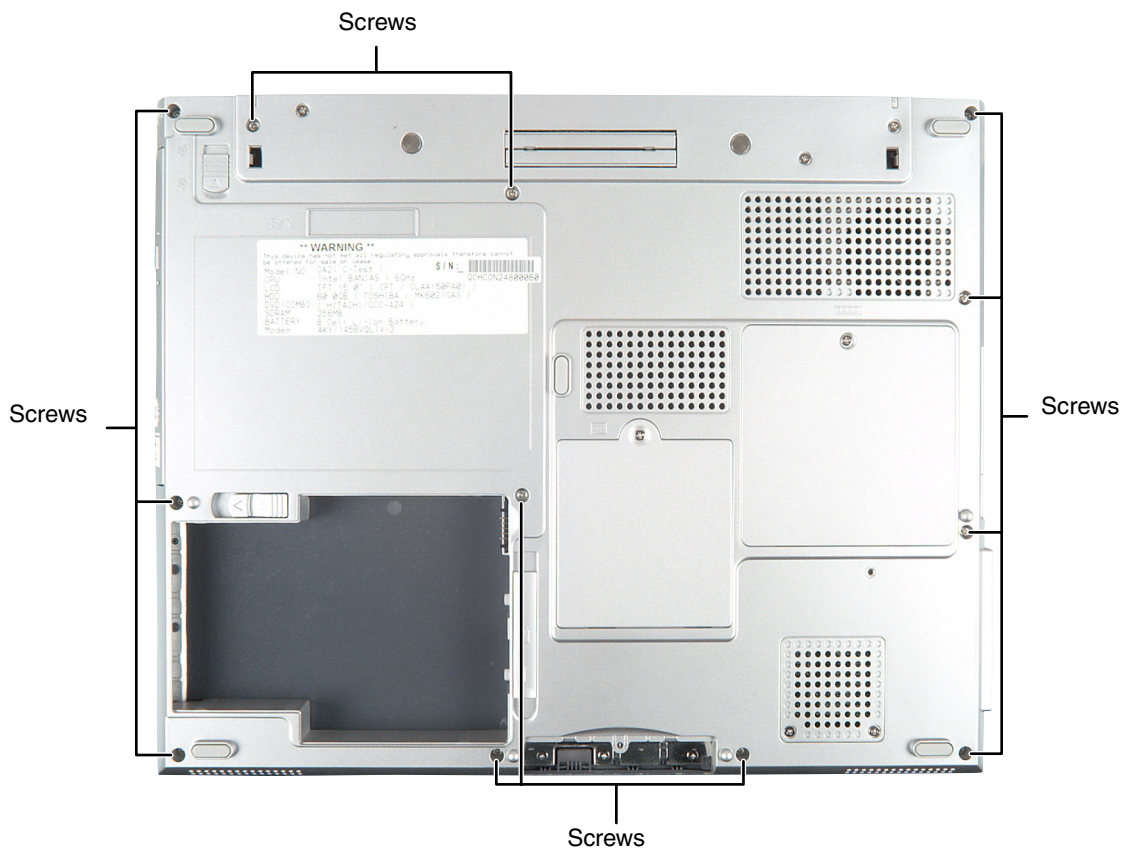


To replace the palm rest assembly:

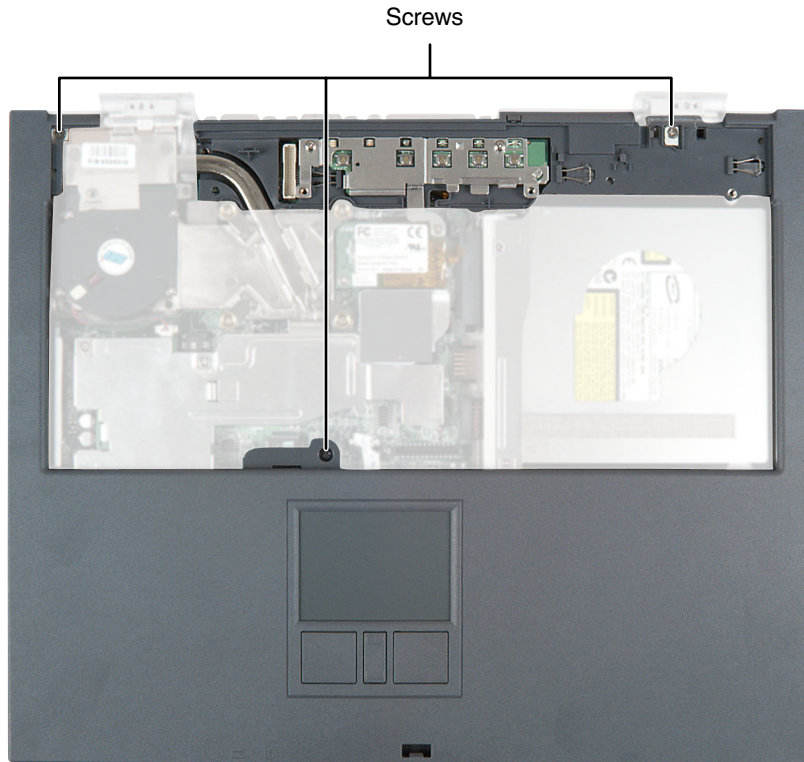
- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2 Turn the notebook over so the bottom is facing up.

- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15](#).
- 6** Turn the notebook over so the top is facing up.
- 7** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 8** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 9** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34](#).
- 10** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 11** Remove both hinge covers by following the instructions in [“Replacing the hinge covers” on page 49](#).

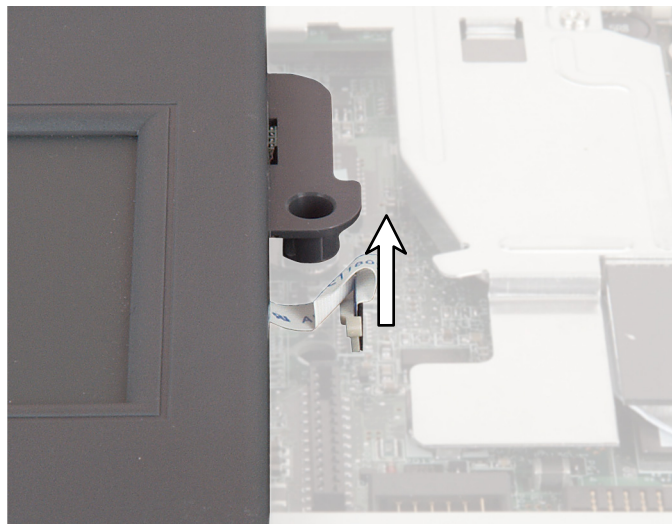
- 12** Unplug the LCD video cable from the notebook by following the instructions in [Step 13](#) on [page 53](#).
- 13** Turn the notebook over, then remove the twelve screws on the bottom of the notebook.



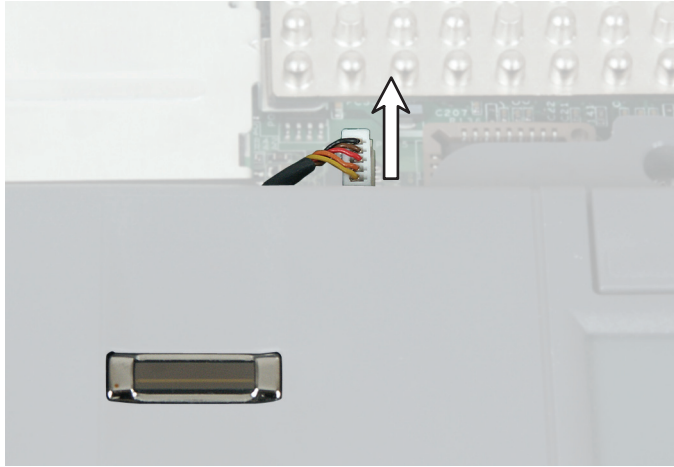
- 14** Open the notebook, then remove the three screws on the top of the notebook.



- 15** Use two fingers to carefully pull up on the touchpad connector tabs. After the connector is in the raised position, carefully pull the cable out of the connector.



- 16** If the notebook has a fingerprint reader, use two fingers to carefully unplug the fingerprint reader connector from the notebook.



- 17** Lift the palm rest assembly completely from the notebook.
- 18** Place the new palm rest assembly onto the notebook, then snap the assembly into place.
- 19** Pull up on the touchpad connector to make sure that it is in the raised position.
- 20** Slide the end of the touchpad cable into the touchpad connector.

Important



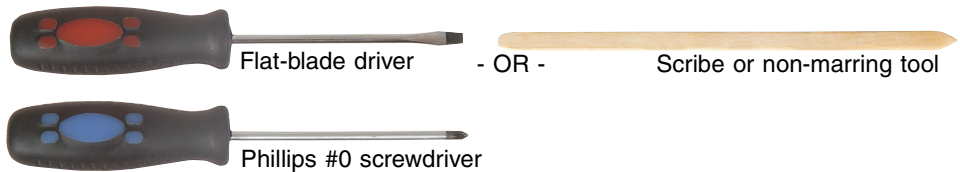
The touchpad cable should slide easily into the touchpad connector. The cable is oriented correctly if it is not twisted.

- 21** Use two fingers to press down on the touchpad connector tabs. This locks the touchpad cable into the touchpad connector.
- 22** Replace all of the palm rest screws. Use the two shortest screws to secure the top-rear corners of the palm rest, which are near the LCD panel hinges.
- 23** If the notebook has a fingerprint reader, use two fingers to carefully plug the fingerprint reader connector into the notebook.
- 24** Reassemble the notebook.
- 25** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

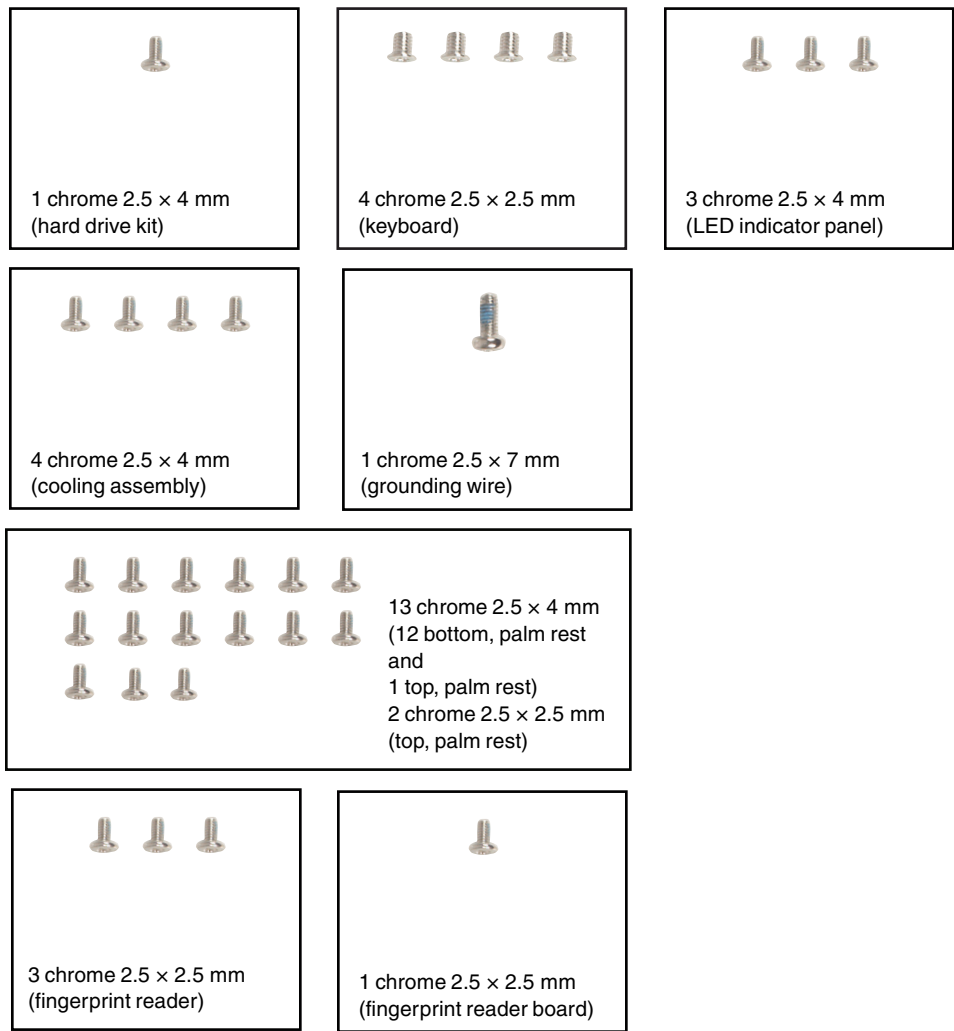


Replacing the fingerprint reader

Tools you need to complete this task:



Screws removed during this task:

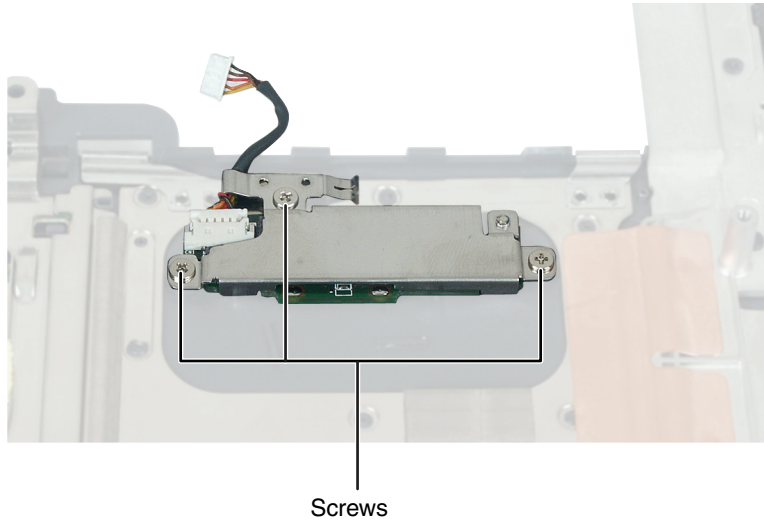




To replace the fingerprint reader:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15](#).
- 6** Turn the notebook over so the top is facing up.
- 7** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 8** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 9** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34](#).
- 10** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 11** Remove both hinge covers by following the instructions in [“Replacing the hinge covers” on page 49](#).
- 12** Unplug the LCD video cable from the notebook by following the instructions in [Step 13 on page 53](#).
- 13** Remove the palm rest assembly by following the instructions in [“Replacing the palm rest assembly” on page 56](#).
- 14** Turn the palm rest assembly over so that the bottom is facing up.

- 15** Remove the three screws that secure the fingerprint reader shield and the attached EMI shield to the notebook.

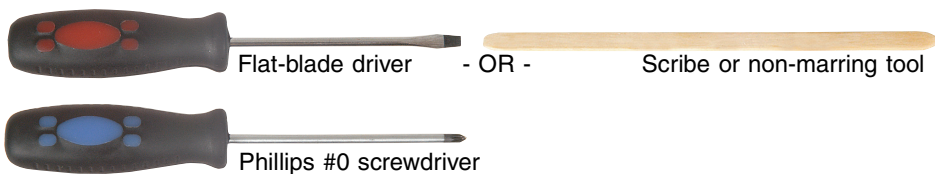


- 16** Turn the fingerprint reader assembly so that the board is facing up.
- 17** Remove the single screw that secures the board to the fingerprint reader shield.
- 18** Place the new board on the fingerprint reader shield, aligning the holes for the screw. Secure the board to the fingerprint reader shield with the single screw.
- 19** Replace the three screws that secure the fingerprint reader shield to the notebook.
- 20** Reassemble the notebook.
- 21** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.

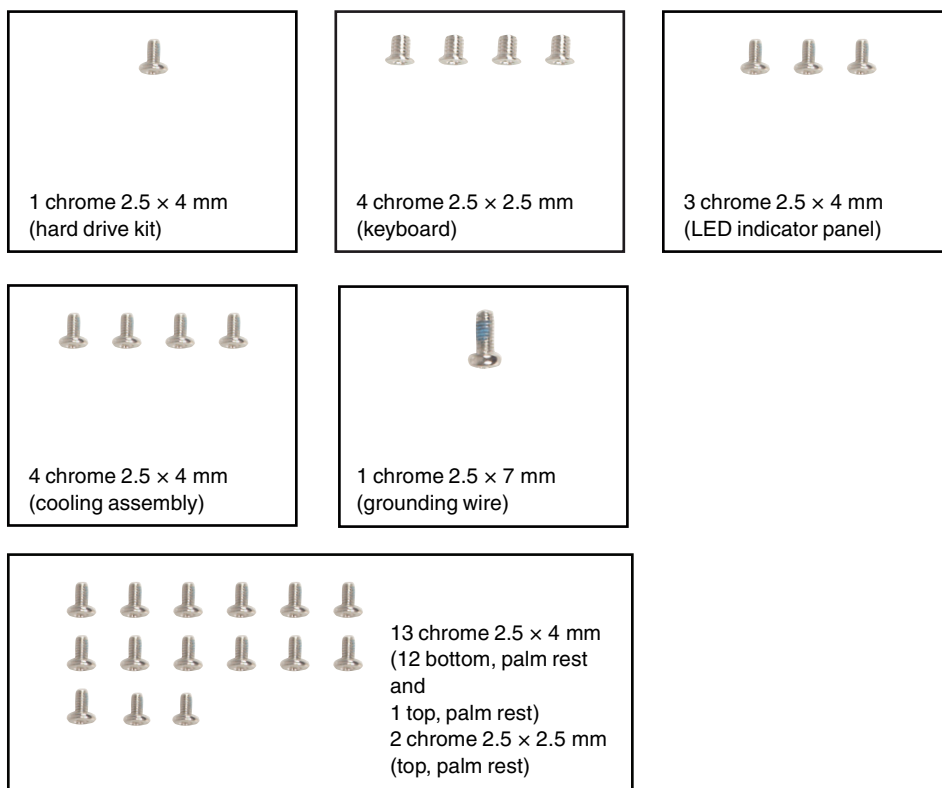


Replacing the CMOS battery

Tools you need to complete this task:



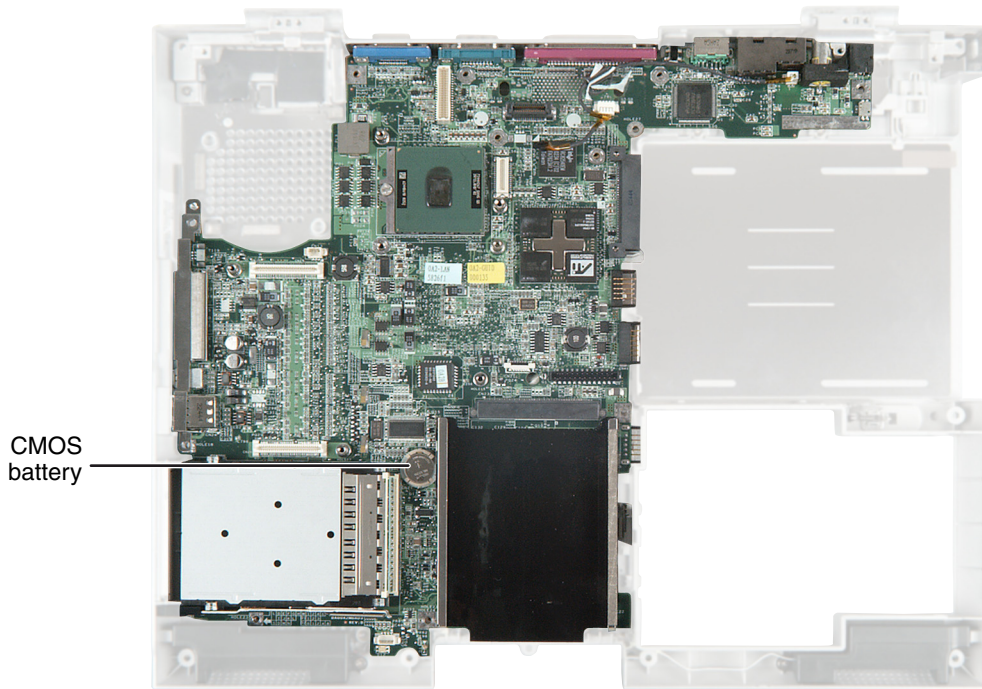
Screws removed during this task:



**To replace the CMOS battery:**

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 3** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 4** Turn the notebook over so the bottom is facing up.
- 5** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 6** Remove the component in the modular bay by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 7** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15](#).
- 8** Turn the notebook over so the top is facing up.
- 9** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 10** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 11** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34](#).
- 12** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 13** Remove both hinge covers by following the instructions in [“Replacing the hinge covers” on page 49](#).
- 14** Unplug the LCD video cable from the notebook by following the instructions in [Step 13 on page 53](#).
- 15** Remove the palm rest assembly by following the instructions in [“Replacing the palm rest assembly” on page 56](#).

- 16** Locate the old CMOS battery on the system board.

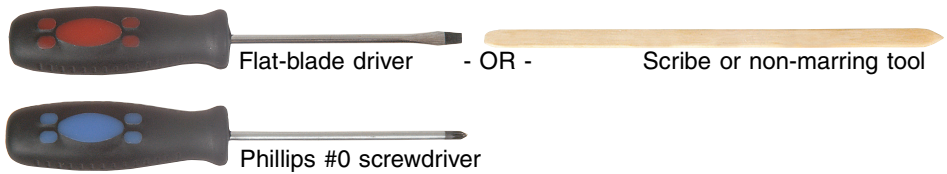


- 17** Insert the small flat-blade screwdriver or non-marring tool under the old battery and gently pry it up until it pops out of the socket.
- 18** Make sure the positive (+) side of the new CMOS battery is facing up, then press the battery into the socket until it snaps into place.
- 19** Reassemble the notebook. Replace the battery and modular bay component. Connect the AC adapter and modem and network cables, then turn on the notebook.

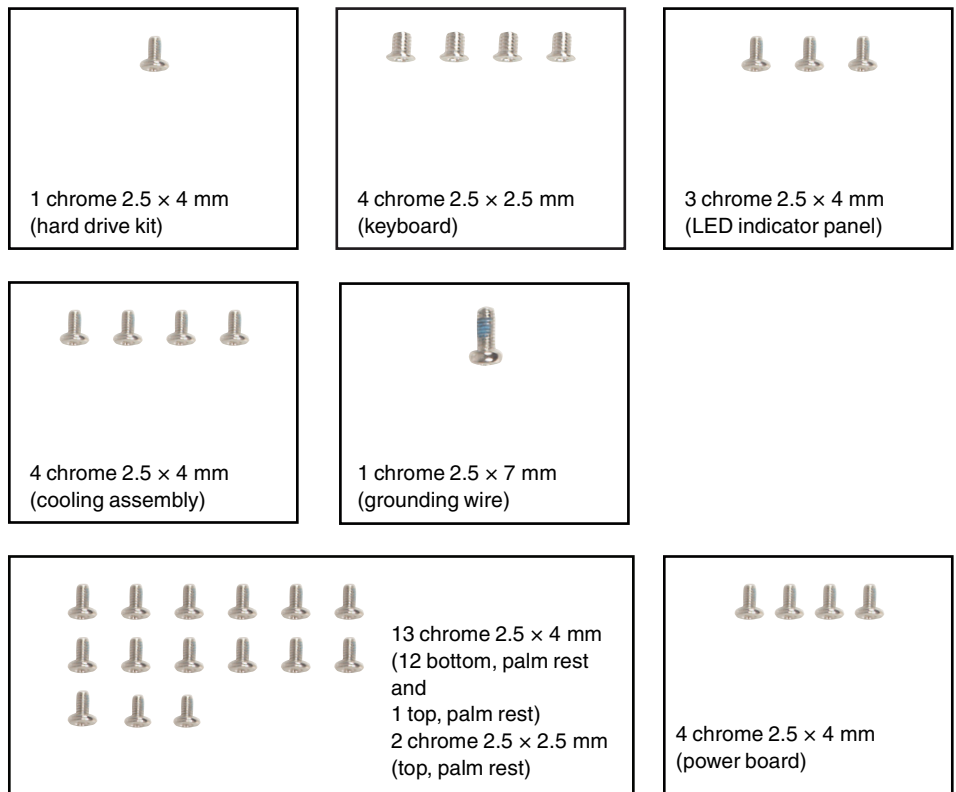


Replacing the power board

Tools you need to complete this task:



Screws removed during this task:

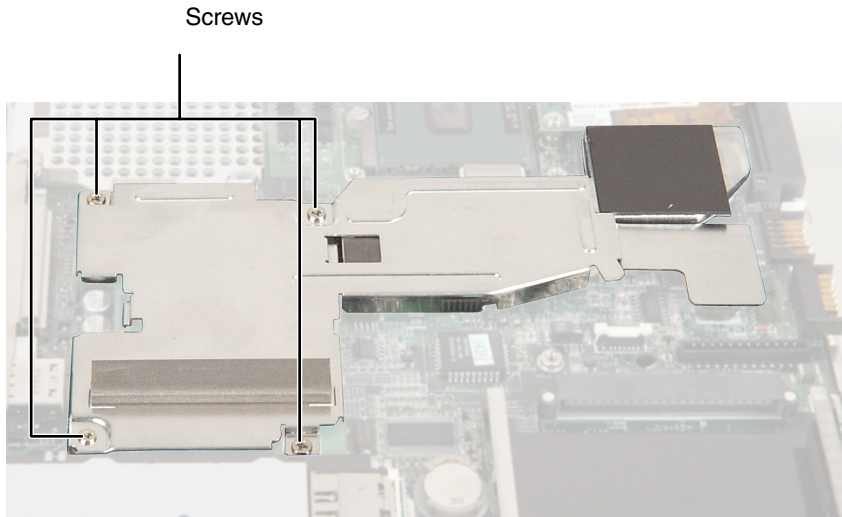


▶ Too replace the power board:

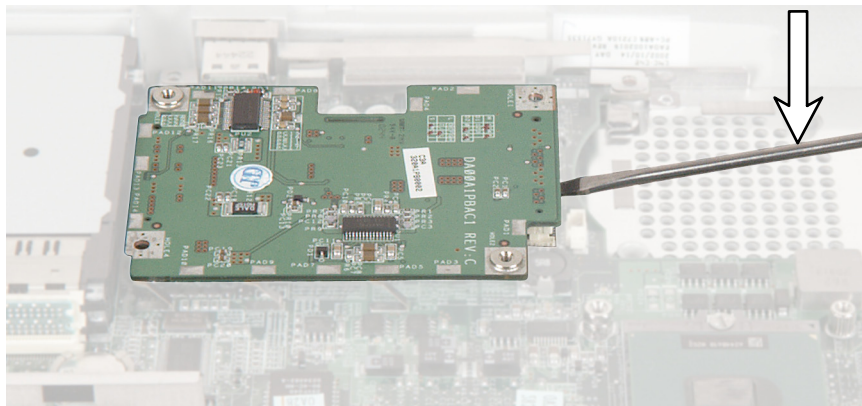
- 1 Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook”](#) on page 7.
- 2 Turn the notebook over so the bottom is facing up.

- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If the modular bay contains the secondary battery, remove the secondary battery by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 5** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15](#).
- 6** Turn the notebook over so the top is facing up.
- 7** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 8** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 9** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34](#).
- 10** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 11** Remove both hinge covers by following the instructions in [“Replacing the hinge covers” on page 49](#).
- 12** Unplug the LCD video cable from the notebook by following the instructions in [Step 13 on page 53](#).
- 13** Remove the palm rest assembly by following the instructions in [“Replacing the palm rest assembly” on page 56](#).

- 14** Remove the four screws that secure the power board EMI shield to the system board.



- 15** Lift the shielding away from the system board.
- 16** Insert the flat-blade screwdriver or non-marring tool under the power board, gently pry it up, and remove it.

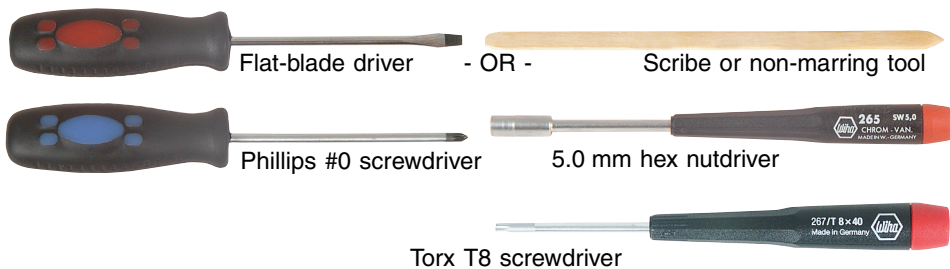


- 17** Align the new power board's screw holes with the holes on the system board, then press the power board into place.
- 18** Replace the power board's EMI shielding, then replace the screws.
- 19** Reassemble the notebook. Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



Replacing the system board

Tools you need to complete this task:



Screws removed during this task:

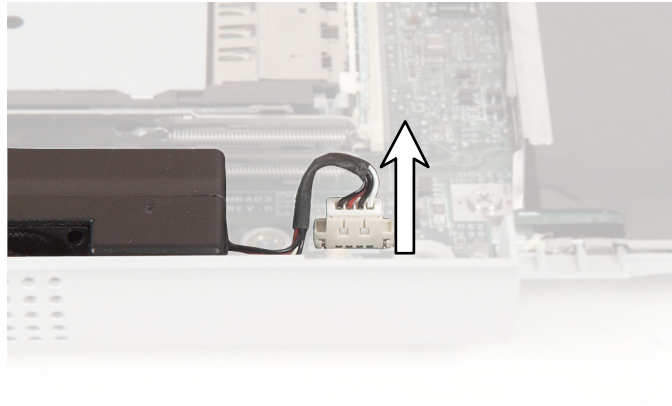
 1 chrome 2.5 × 4 mm (hard drive kit)	 4 chrome 2.5 × 2.5 mm (keyboard)	 3 chrome 2.5 × 4 mm (LED indicator panel)
 1 chrome 2.5 × 4 mm 1 chrome 2.5 × 2.5 mm (modem)	 4 chrome 2.5 × 4 mm (cooling assembly)	 5 chrome 2.5 × 7 mm (hinges and grounding wire)
 13 chrome 2.5 × 4 mm (12 bottom, palm rest and 1 top, palm rest) 2 chrome 2.5 × 2.5 mm (top, palm rest)		
 4 chrome 2.5 × 4 mm (power board)	 8 chrome 5 × 9 mm (6 rear I/O panel and 2 system board)	
 2 chrome 5 × 11 mm (system board)	 4 chrome 2.5 × 4 mm (system board)	



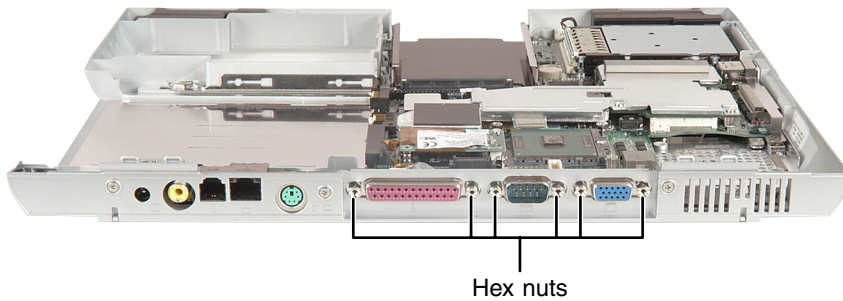
To replace the system board:

- 1** Disconnect the AC adapter, modem and network cables, then prepare the notebook by following the instructions in [“Preparing the notebook” on page 7](#).
- 2** Turn the notebook over so the bottom is facing up.
- 3** Remove the main battery by following the instructions in [“Removing the main battery” on page 8](#).
- 4** If a drive module is in the modular drive bay, make sure that the drive is empty.
- 5** Remove the component in the modular bay by following the instructions in [“Replacing the modular bay component” on page 10](#).
- 6** Remove the memory modules by following the instructions in [“Adding or replacing memory modules” on page 12](#).
- 7** If the notebook has IEEE 802.11 wireless networking built in, remove the IEEE 802.11 Mini PCI module by following the instructions in [“Replacing the IEEE 802.11 Mini PCI card” on page 15](#).
- 8** Remove the hard drive kit by following the instructions in [“Replacing the hard drive kit” on page 19](#).
- 9** Turn the notebook over so the top is facing up.
- 10** Remove the keyboard cover by following the instructions in [“Replacing the keyboard cover” on page 25](#).
- 11** Remove the keyboard by following the instructions in [“Replacing the keyboard” on page 28](#).
- 12** Remove the LED indicator panel by following the instructions in [“Replacing the LED indicator panel” on page 34](#).
- 13** Remove the modem by following the instructions in [“Replacing the modem” on page 37](#).
- 14** Remove the cooling assembly by following the instructions in [“Replacing the cooling assembly” on page 41](#).
- 15** Remove the hinge covers by following the instructions in [“Replacing the hinge covers” on page 49](#).
- 16** Remove the LCD panel by following the instructions in [“Replacing the LCD panel assembly” on page 51](#).
- 17** Remove the palm rest assembly by following the instructions in [“Replacing the palm rest assembly” on page 56](#).

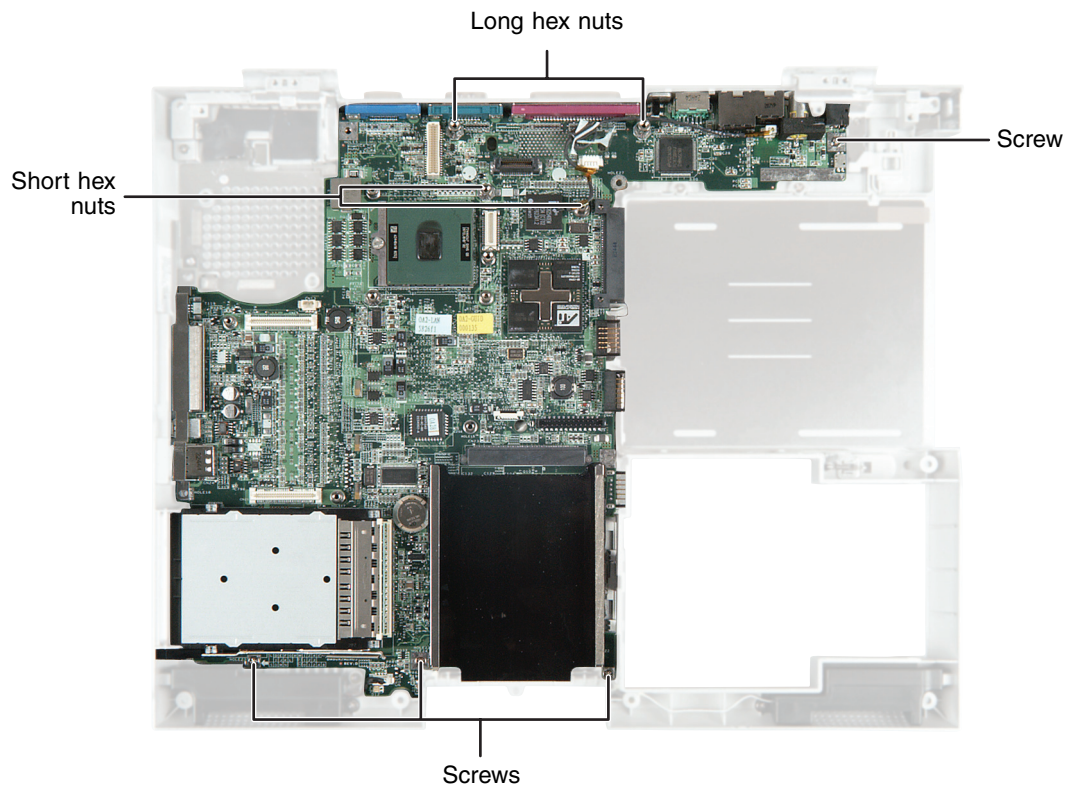
- 18** Remove the power board by following the instructions in [“Replacing the power board” on page 67](#).
- 19** Unplug the speakers from the system board (one connector).



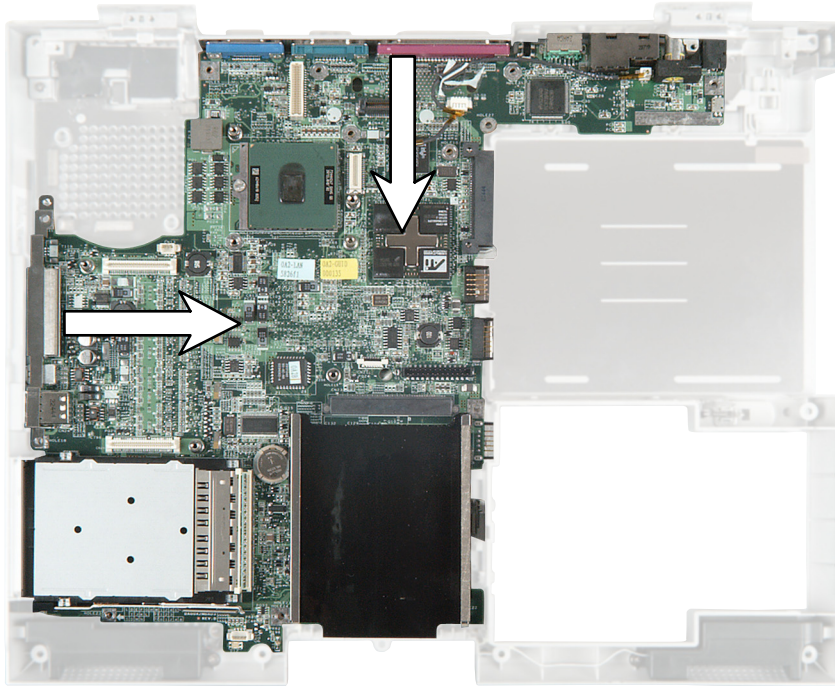
- 20** Remove the six hex nuts on the rear I/O panel.



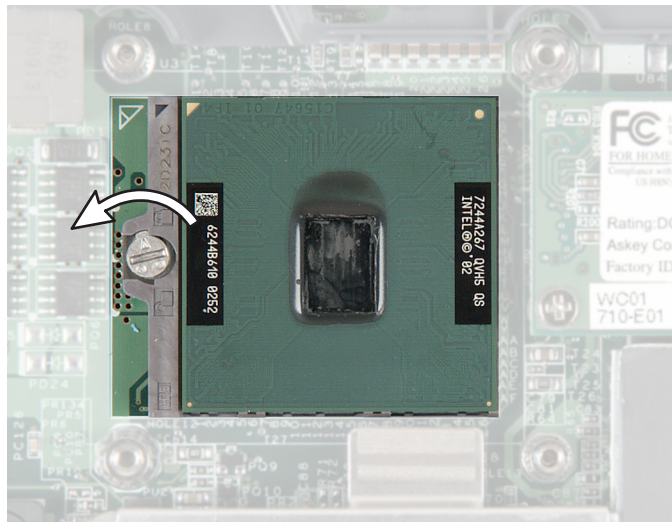
- 21** Remove the four system board screws and the four system board hex nuts.



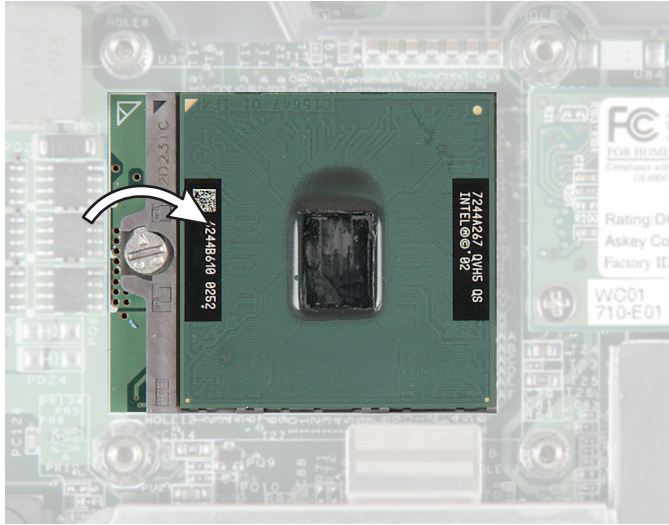
- 22** While pushing in on the PC Card eject button, remove the system board. Make sure that the rear I/O panel clears the bottom of the chassis (shown by the top arrow) and the side audio jacks clear the bottom of the chassis (shown by the left arrow).



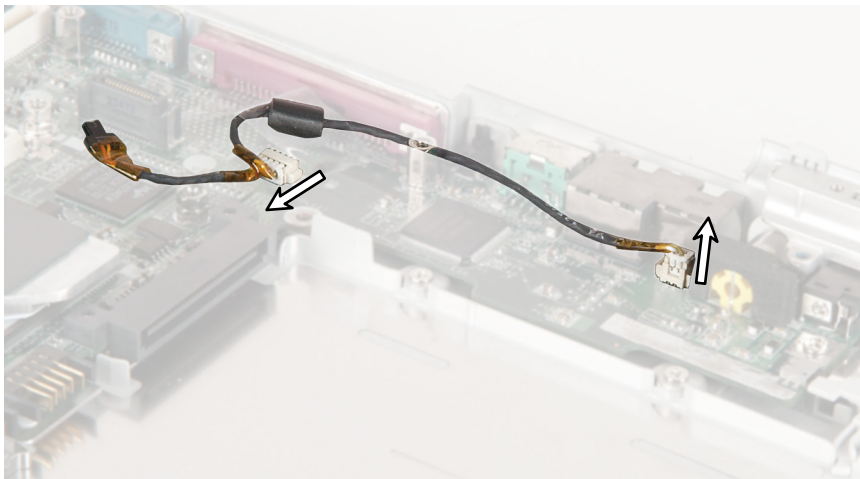
- 23** Use a flat-blade screwdriver to turn the processor lock screw ¼-turn counter-clockwise, then remove the processor from the old system board.



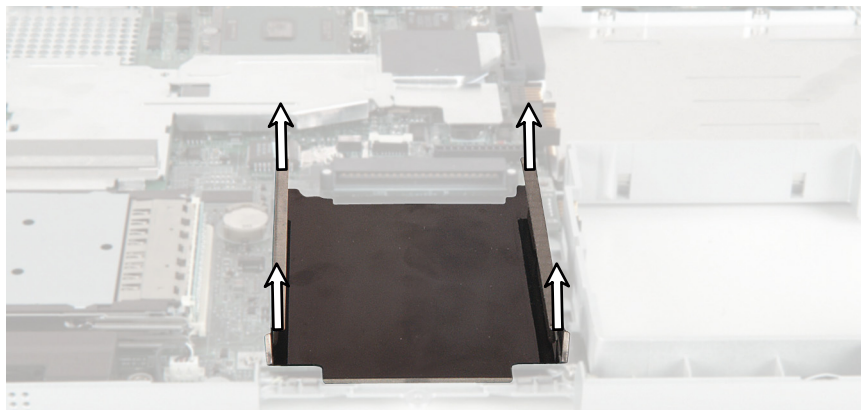
- 24** Install the processor onto the new system board making sure that Pin 1 on the processor (indicated by the silk-screened arrow on the corner of the processor) aligns with Pin 1 on the processor socket (indicated by the absence of a pin hole in the processor socket). Lock the processor in place by using a flat-blade screwdriver to turn the processor lock screw $\frac{1}{4}$ -turn clockwise.



- 25** Remove the modem cable from the old system board and install it on the new board.



- 26** If the new system board does not have a hard drive kit tray, remove the hard drive kit tray from the old system board and install it on the new board. The tray is attached to the system board with adhesive as well as four tabs that protrude through the system board. Be careful not to bend the tray or break the system board.



- 27** Place the new system board into the notebook.
- 28** Replace the four chrome system board screws from the holes marked 6, 22, 23, and 24; the long hex nuts from the holes marked 2 and 3; and the short hex nuts from the holes marked 7, 10, and 12.
- 29** Replace the six rear I/O panel hex nuts.
- 30** Connect the speakers.
- 31** Reassemble the notebook.
- 32** Replace the main battery and secondary battery (if installed). Connect the AC adapter and modem and network cables, then turn on the notebook.



MAN SYS 450 RGH SERVICE GDE R0 3/04



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