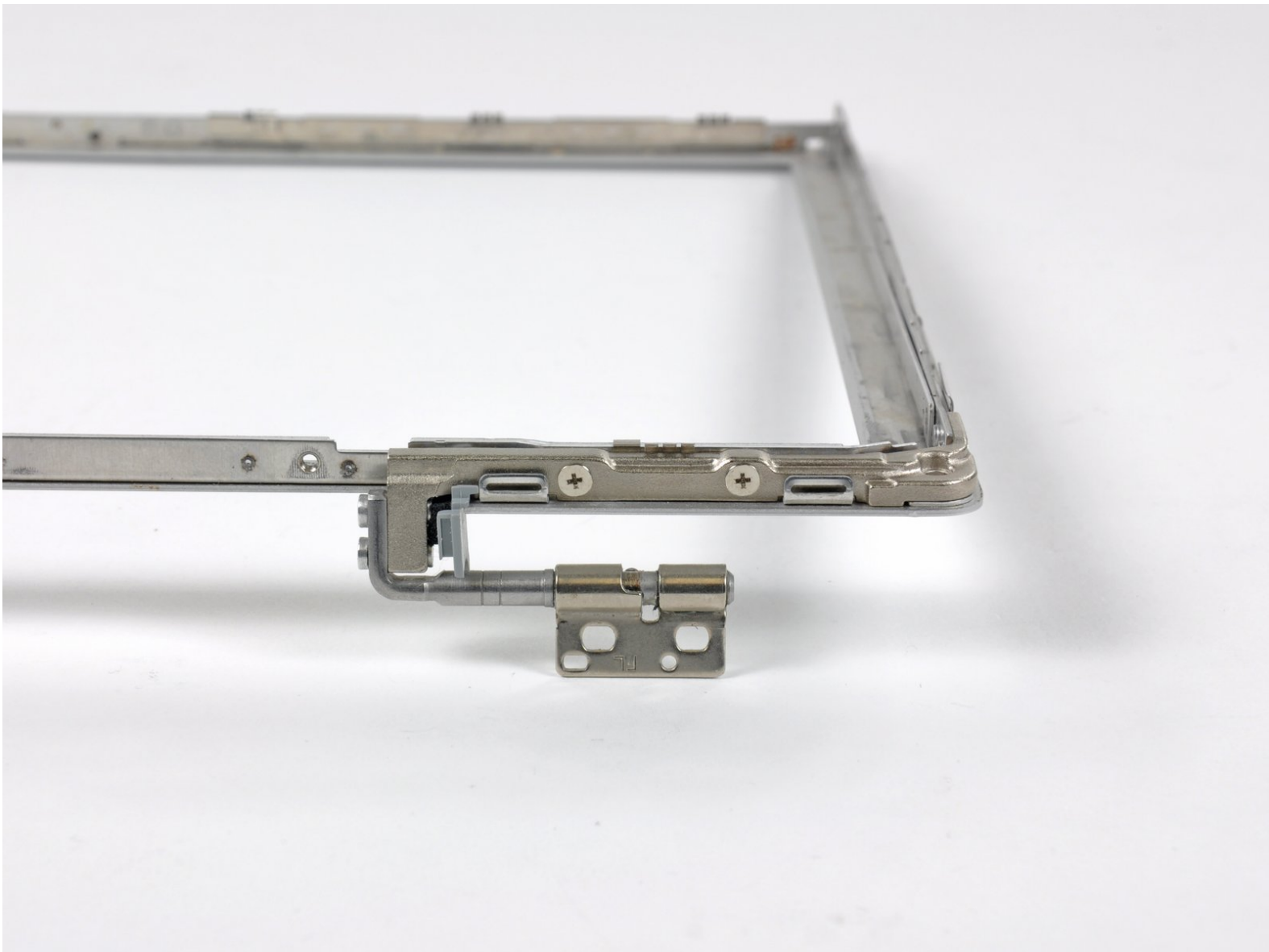




# PowerBook G4 Aluminum 12" 1-1.5 GHz Left Clutch Hinge Replacement

Written By: Matthew Newsom



# INTRODUCTION

Replace a broken clutch hinge to make your display open silky smooth.



## TOOLS:

- [4mm Nut Driver](#) (1)
- [Arctic Silver ArctiClean](#) (1)
- [Arctic Silver Thermal Paste](#) (1)
- [Coin](#) (1)
- [Phillips #00 Screwdriver](#) (1)
- [Spudger](#) (1)
- [T6 Torx Screwdriver](#) (1)



## PARTS:

- [G4 Aluminum 12" Left Clutch Hinge](#) (1)

## Step 1 — Battery



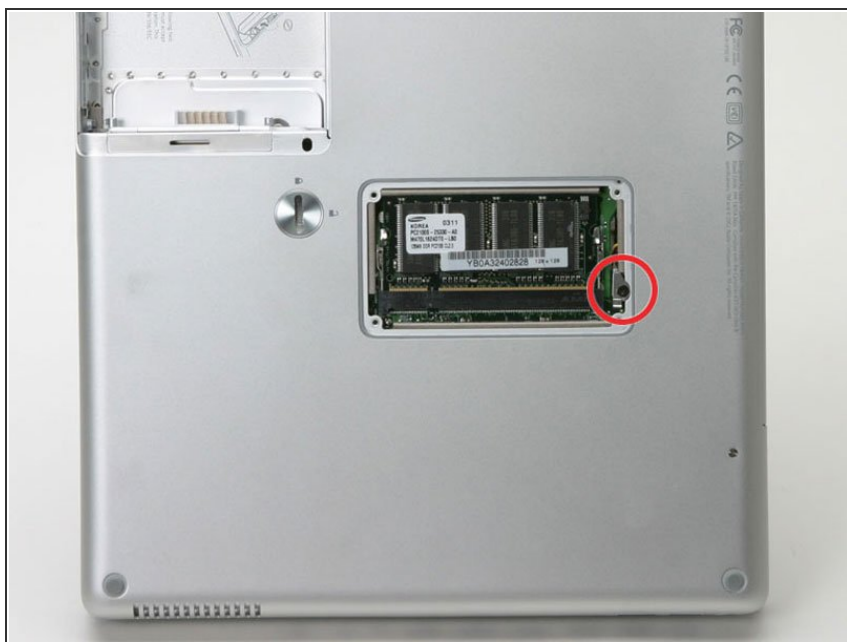
- Use a coin to turn the battery locking screw 90 degrees to the right.
- Lift the battery out of the computer.

## Step 2 — EMI Finger



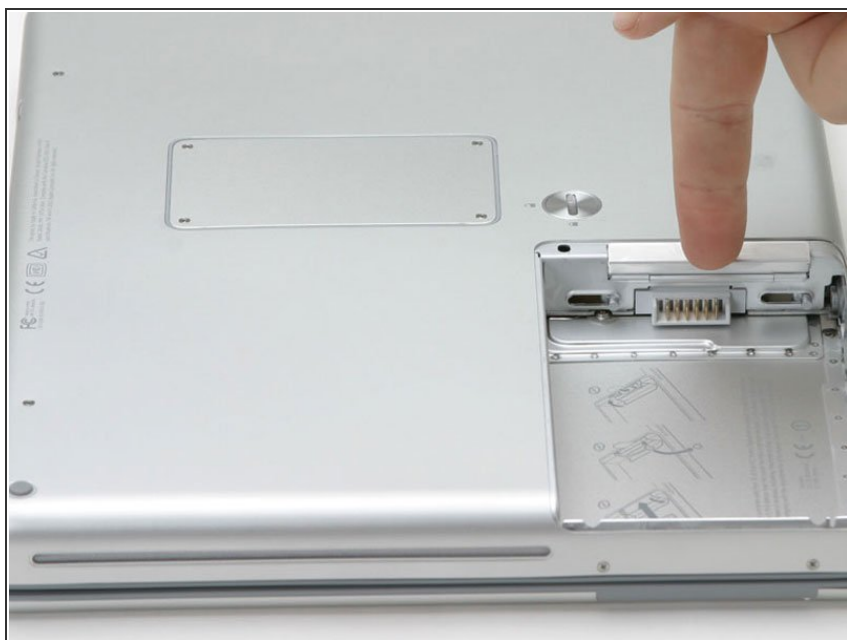
- Remove the four Phillips screws from the memory door.
- Slide the memory door away from the memory compartment.

## Step 3



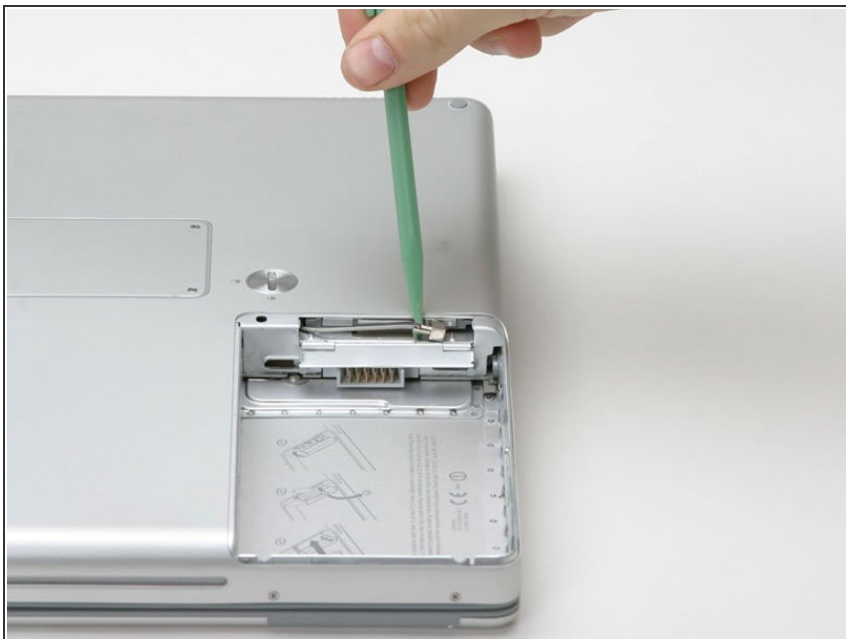
- Remove the long black Phillips screw next to the memory card.
- Remove the small EMI finger beneath the black screw.

## Step 4 — Airport Extreme Card



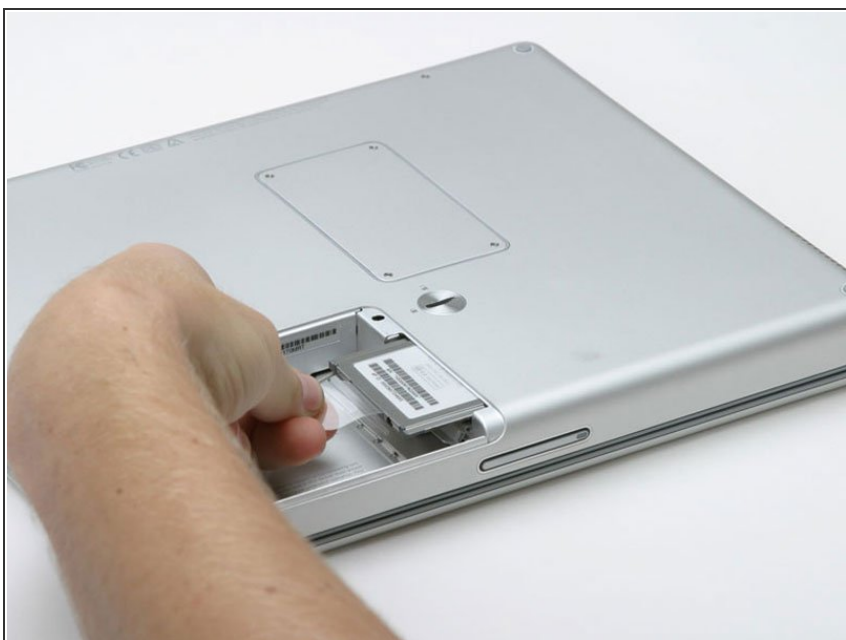
- Flip down the door on the right side of the battery compartment.

## Step 5



- Use a spudger or flathead screwdriver to disconnect the Airport antenna from the card.

## Step 6



- Grasp the plastic tab and pull the card out all the way.

## Step 7 — Keyboard



- On the keyboard, remove the F1, F2, F11, and F12 keys.
  - This is scary - take a deep breath before continuing. Place your index finger under the upper left corner of the key and lift up until you hear a click. Then, transfer your finger to the left edge of the key and lift up to pull the key off.
  - You're freeing the two tabs on the left of the key from the two small holes in the plastic scissors mechanism.
- ★ When replacing the keys in the keyboard, place the key directly over the slot where it will go and press down until you hear the key click into place.



## Step 8



- Use your fingernail or a small flathead screwdriver to peel up the gray stickers covering each of the screws.

## Step 9



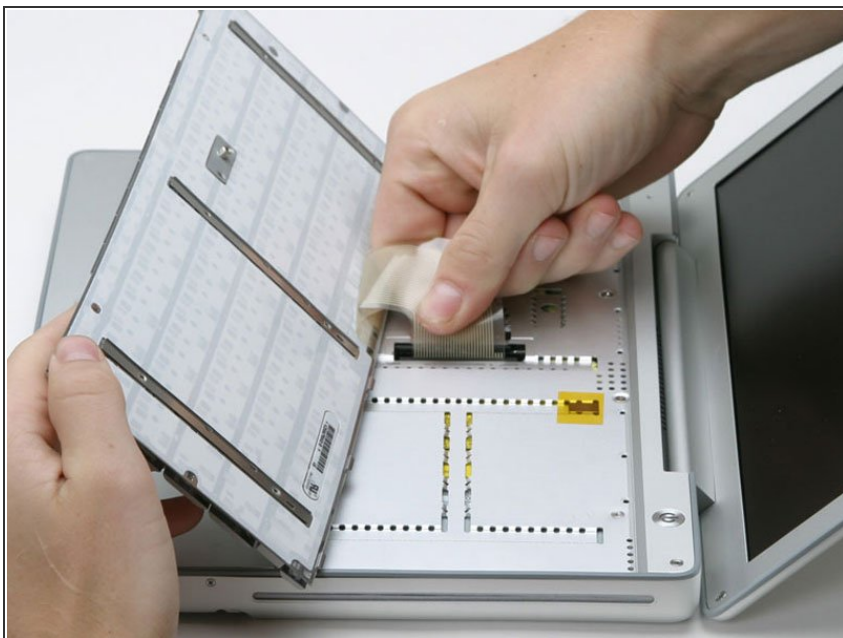
- Remove the two short Phillips screws.

## Step 10



- Lift the keyboard by the 'esc' and 'eject' keys and gently lift up until the keyboard is vertical.

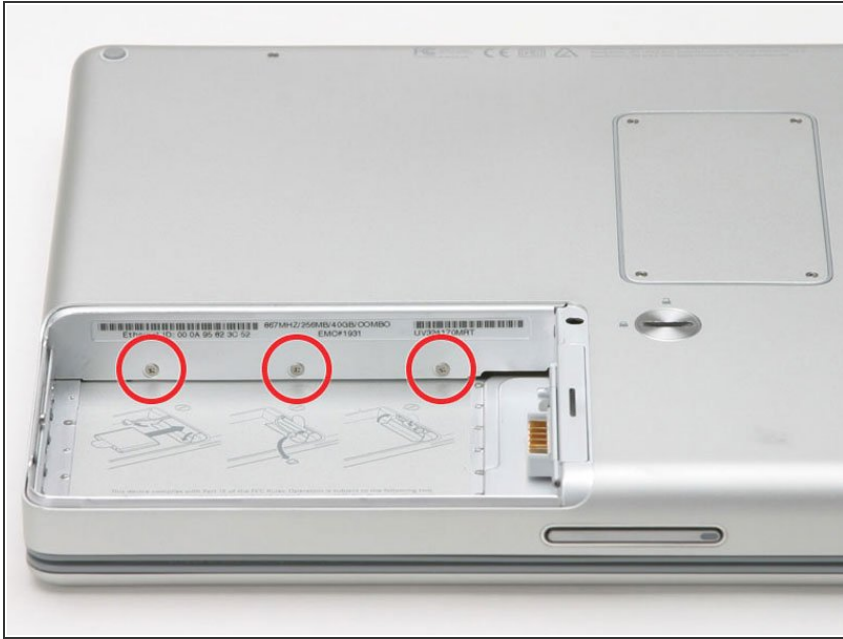
## Step 11



- Grasp the keyboard connector ribbon near the connector and disconnect it from the logic board.



## Step 12 — Upper Case



- Remove the three 2.5mm Phillips screws from within the battery compartment.

## Step 13



- Turn the computer 90 degrees clockwise and remove the two Phillips screws from the casing.
- Outside case screws are aprox. 1/4 in long

## Step 14



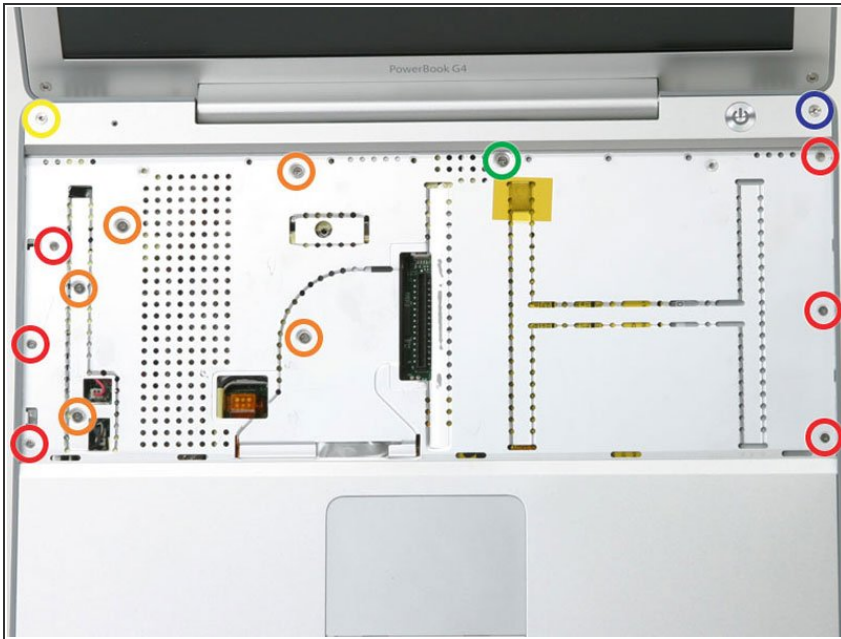
- Turn the computer 90 degrees clockwise again, and remove only the bottom screw on either side of the hinge.

## Step 15



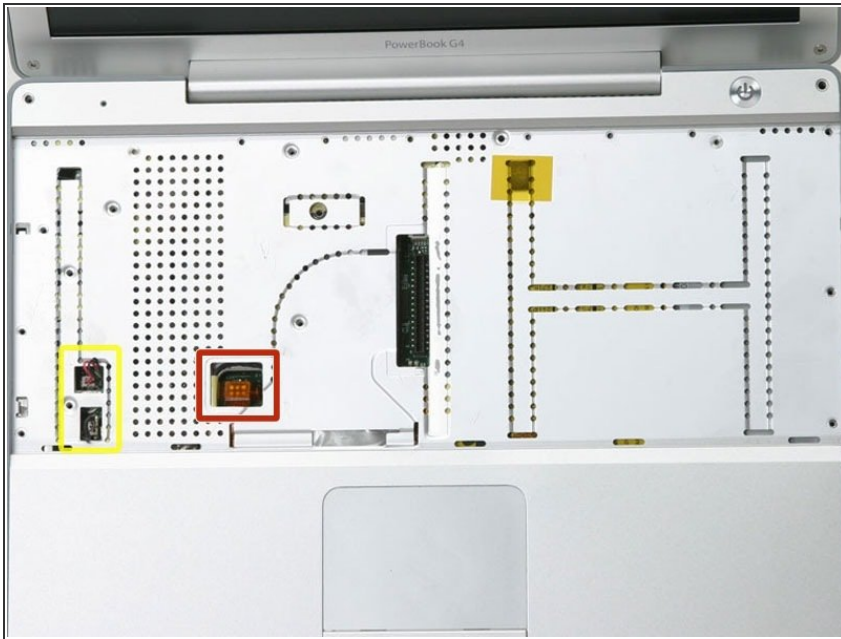
- Turn the computer 90 degrees clockwise just one more time, and remove the two Phillips screws on the exterior wall of the battery compartment.
- Note: For reassembly the two screws have long necks.

## Step 16



- Turn the computer over and open it up.
- Remove the following 14 screws:
  - Six 2.5 mm Phillips on either side of the keyboard area.
  - Five 4.5 mm Phillips on the left half of the keyboard area.
  - One 7 mm hex in the upper left corner of the upper case (a T6 Torx driver will do the job nicely).
  - One 15 mm Phillips in the upper middle of the keyboard area.
  - One 16.5 mm hex in the upper right of the upper case (again, a T6 Torx driver will work well).

## Step 17



**⚠** This step is extremely tricky, and has the potential to ruin your computer. It is easy to pull the plug with the red and black leads (the power) out of the motherboard. If you do that, it is nearly impossible to fix.

- Peel up the two pieces of foil tape on the left side of the keyboard area.

**⚠** The connectors at the ends of the cables are attached very firmly to the sockets on the logic board. Pulling directly on the cable will either separate the cable from its connector or the socket from the logic board.

- Carefully disconnect the microphone and power cables from the logic board. Using your fingernails or a dental pick, carefully pry the connectors from their sockets. Make sure you're pulling only on the connector and not on the socket.

## Step 18



- Starting at one of the upper corners near the screen, work around the frame, separating the upper case from the lower case.

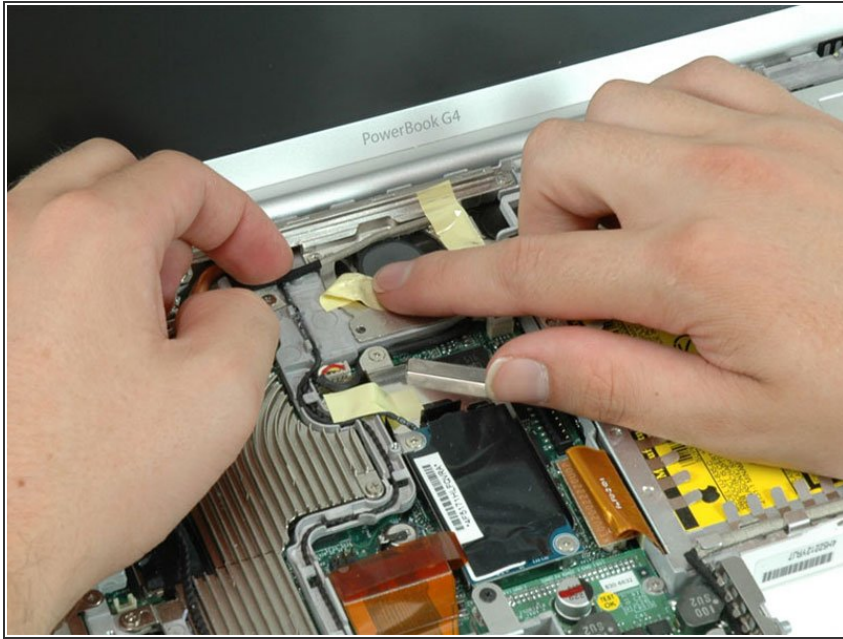


## Step 19



- Using a screw driver, gently release the two grey plastic clips inside the battery compartment in order to remove the right part of the upper case.
- There are two more grey plastic clips holding the left part of the upper case. They are not easy to release as they are hidden from view prior to disassembly. They are in the same position as the two in the battery compartment, but on the opposite side of the trackpad. Try to stick a flat pry tool into the clip holes and push the clips inward (toward to screen) so they disengage and release the left part of the upper case.
- Lift the upper case off the computer.

## Step 20 — Heat Sink



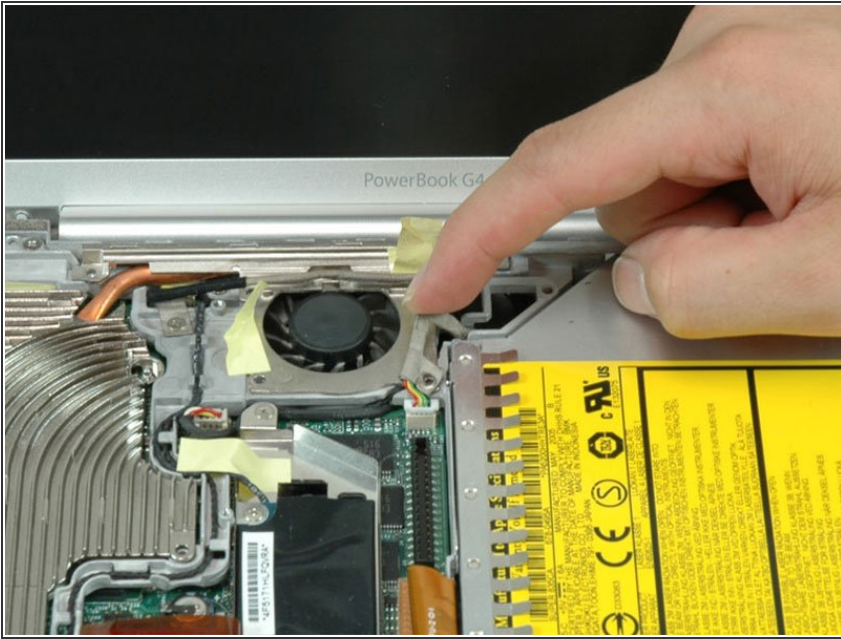
- Peel back the yellow tape securing the inverter cable near the fan.

## Step 21



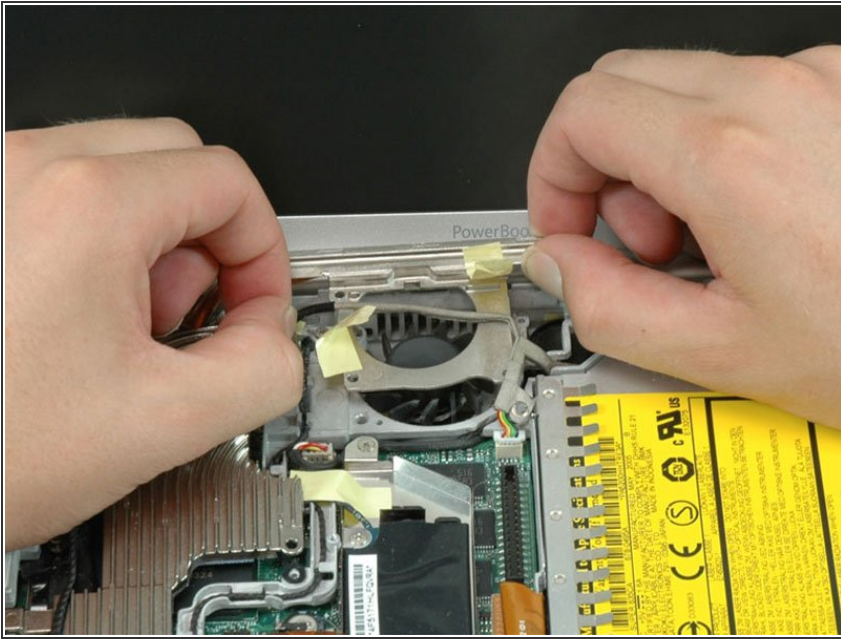
- Remove the following eight screws:
  - One 4.5 mm Phillips near the modem.
  - Three 6 mm Phillips near the display.
  - Two large 7.5 mm Phillips with attached springs.
  - Two 13 mm Phillips, one on the lower left side of the heat sink and one between the fan and the optical drive.

## Step 22



- Peel up the Bluetooth cable on the right side of the fan.

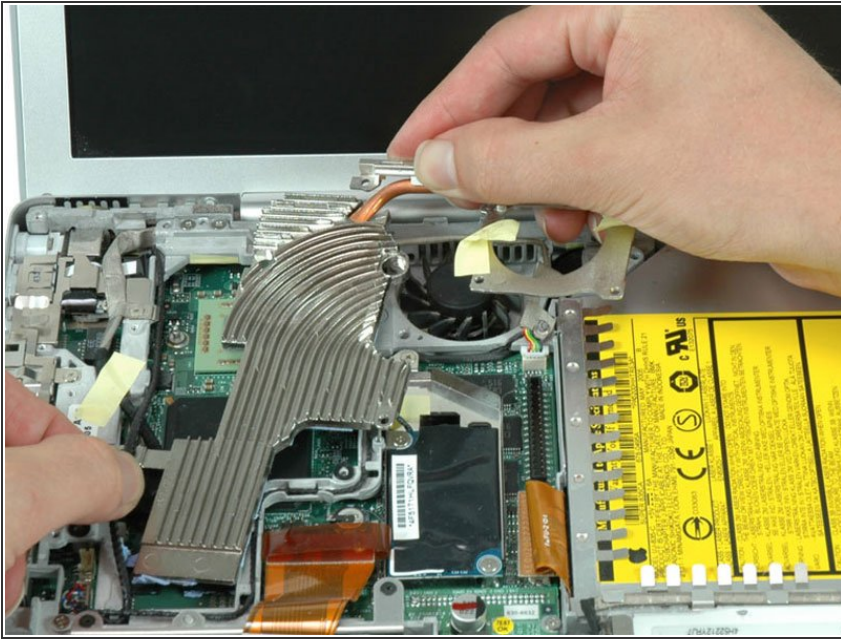
## Step 23



- Lift up the inverter cable with one hand, and carefully thread it around the heat sink. The inverter cable is still attached to the logic board, so be careful not to put too much strain on the cable.



## Step 24



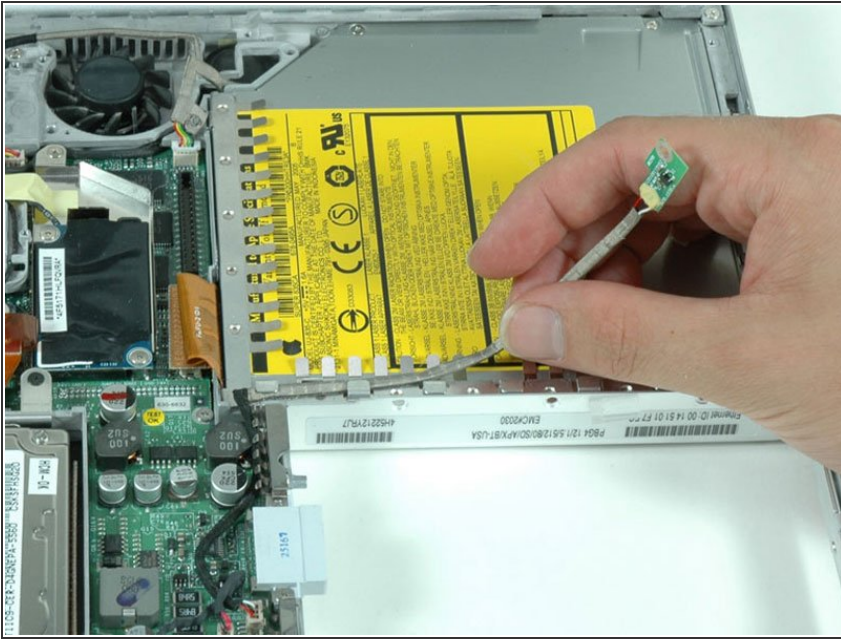
- Support the heat sink with both hands, and carefully lift it out of the computer. Be careful not to bend the copper heat pipe connecting the two sections of the heat sink.
- ⓘ If you need to mount the heat sink back into the laptop, we have a [thermal paste guide](#) that makes replacing the thermal compound easy.

## Step 25 — Metal Framework



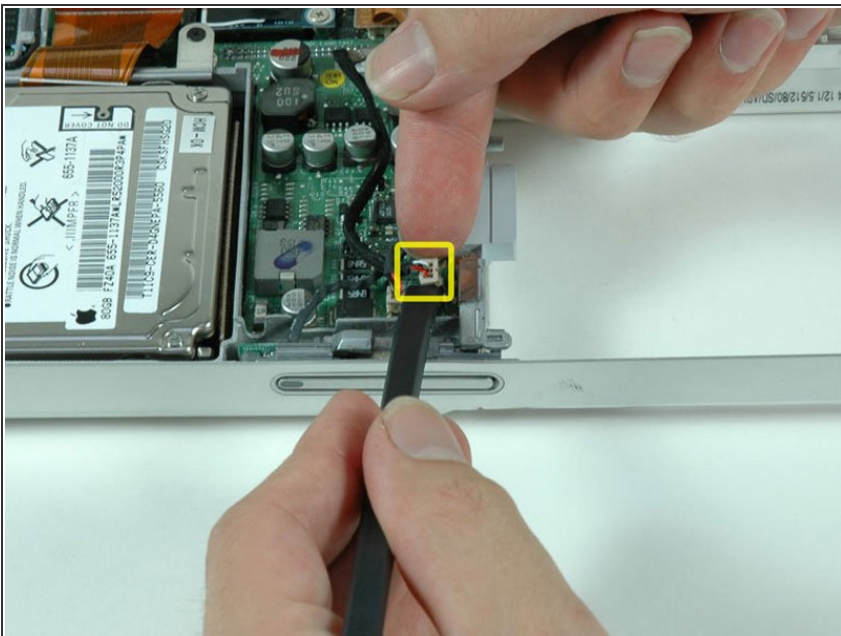
- Remove the single Phillips screw securing the hall effect sensor board to the optical drive.

## Step 26



- Deroute the cable connecting the hall effect sensor board to the DC-to-DC board.

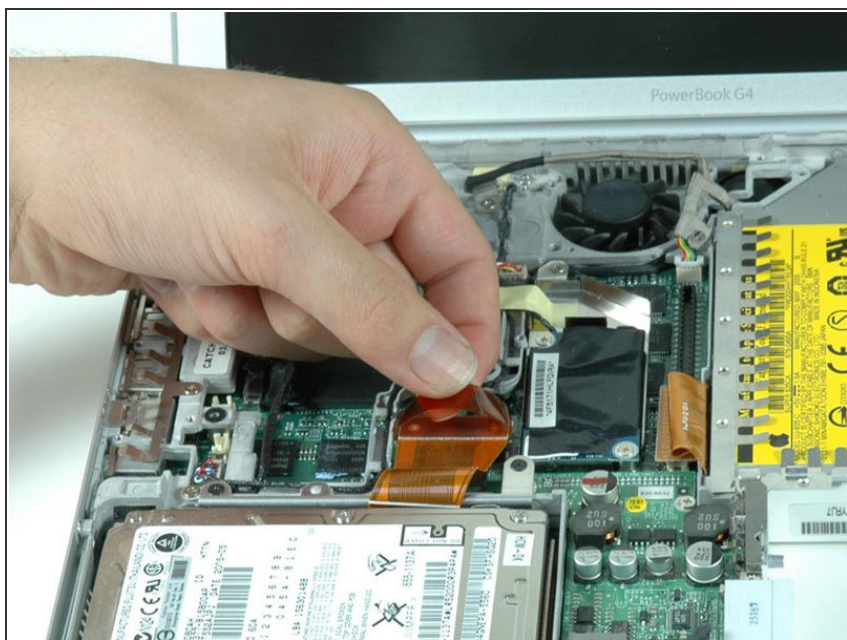
## Step 27



- Use a spudger or the tip of your finger to disconnect the hall effect sensor cable from the DC-to-DC board.



## Step 28



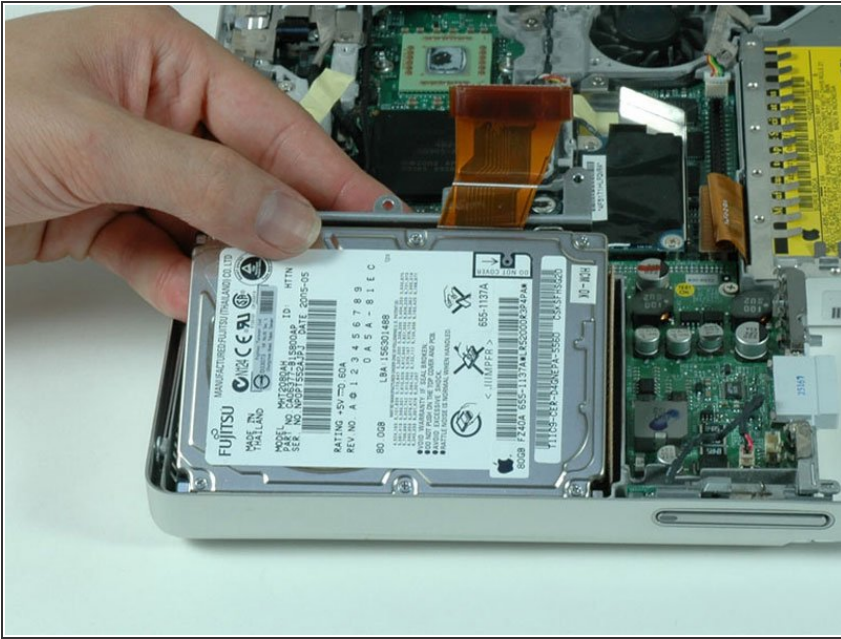
- Use the orange plastic loop to disconnect the hard drive cable from the logic board.

## Step 29



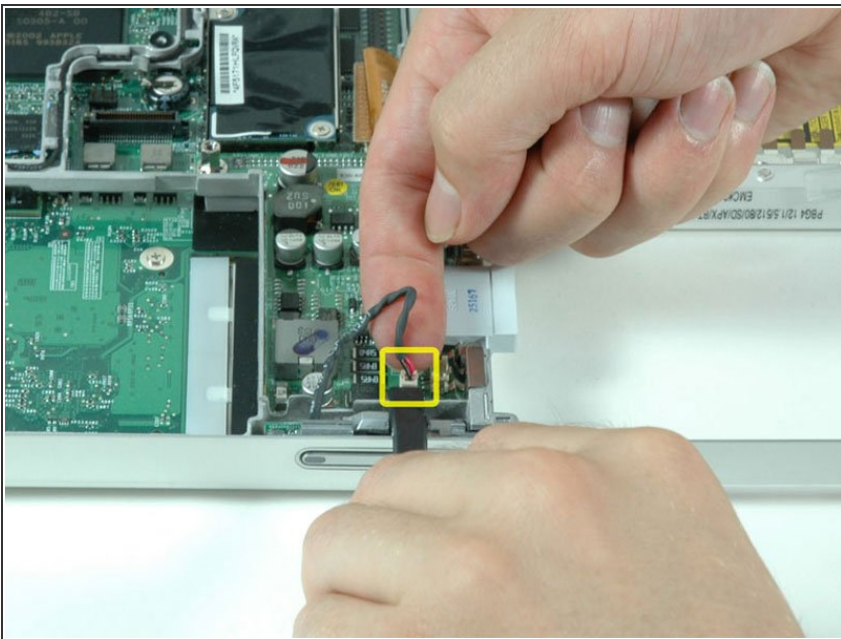
- Remove the two Phillips screws securing the hard drive bracket to the metal framework.

## Step 30



- Lift the hard drive up and out of the computer.

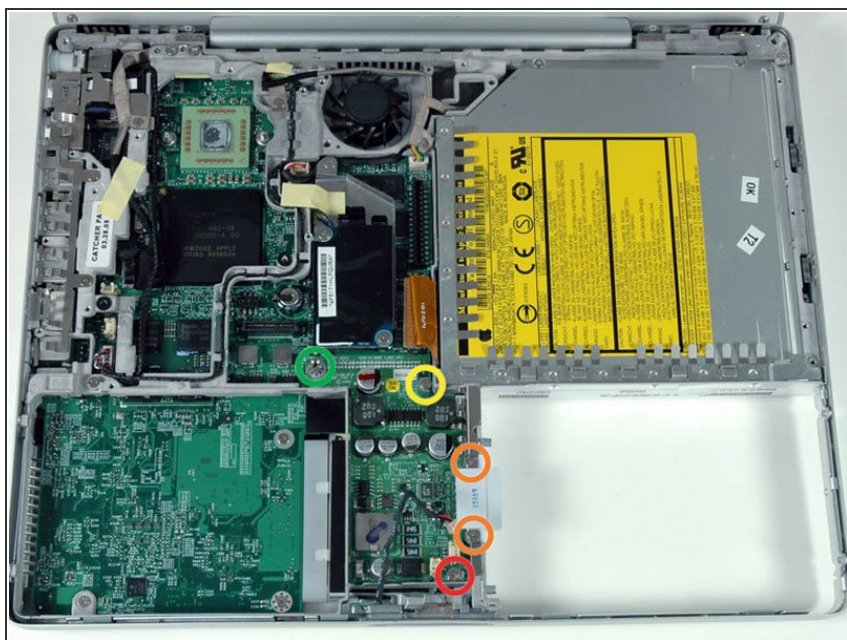
## Step 31



- Use a spudger or the tip of your finger to disconnect the sleep light cable from the DC-to-DC board.

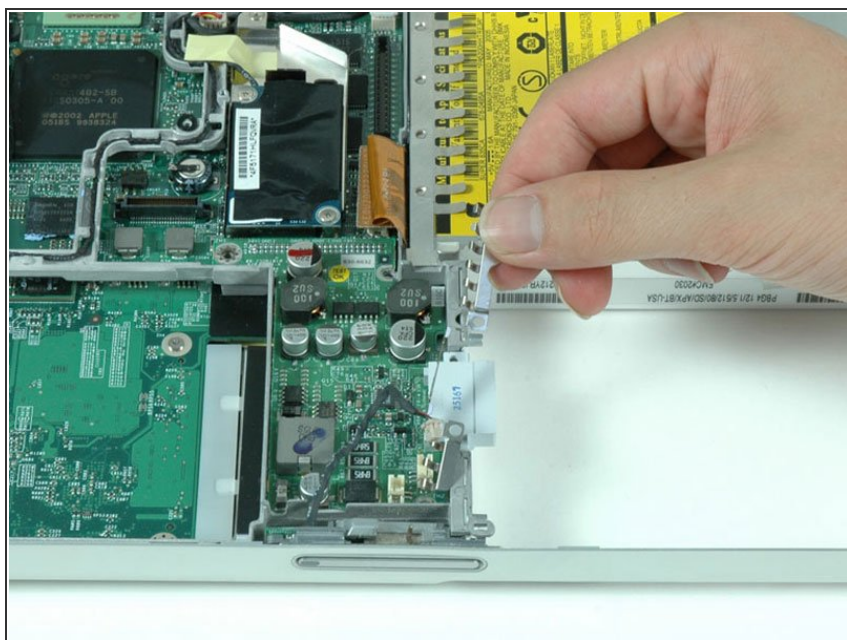


## Step 32



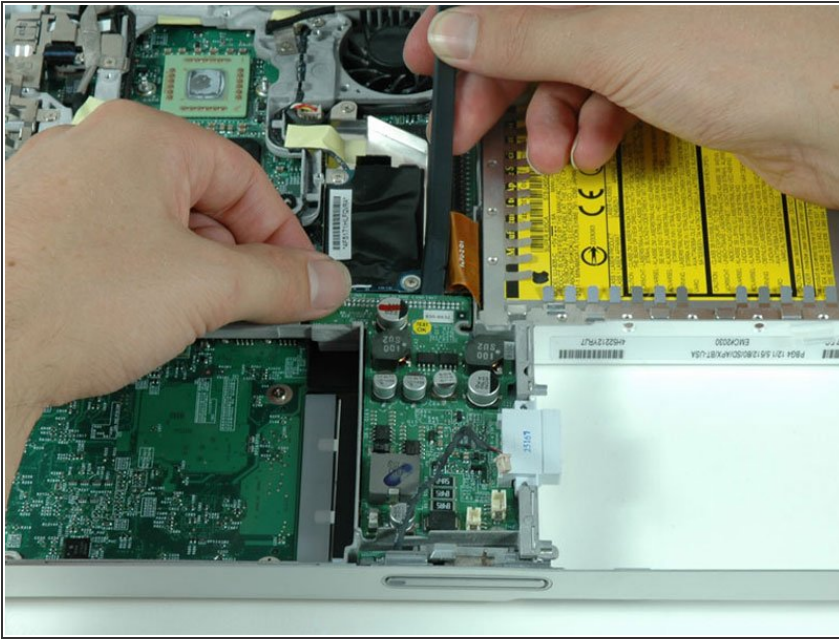
- Remove the following five screws/standoffs from the DC-to-DC board:
  - One 3.5 mm Phillips in the lower right corner.
  - Two 3 mm Phillips on either side of the battery contacts.
  - One 10 mm Phillips in the upper right corner.
  - One 14 mm long 4 mm standoff in the upper left corner. You can remove this standoff either with a 4 mm nut driver or needlenose pliers.

## Step 33



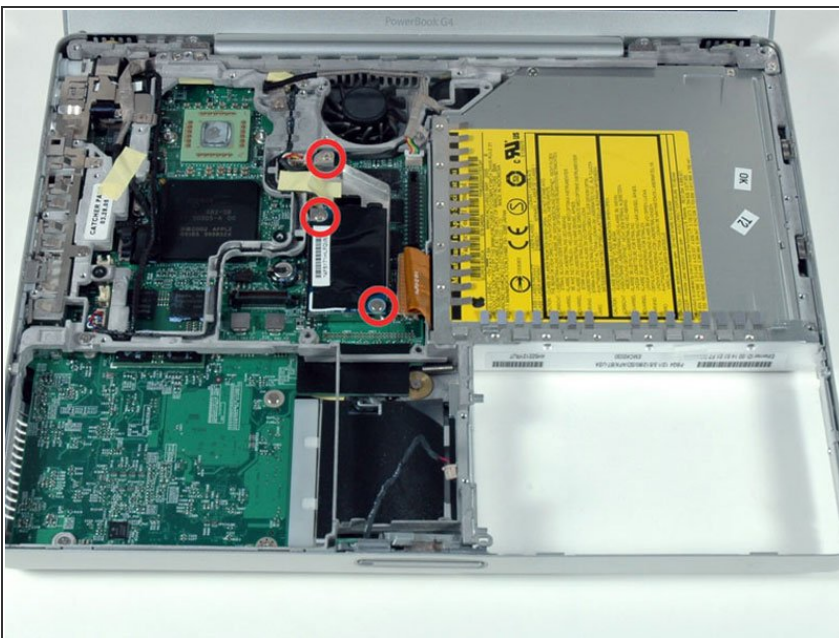
- Remove the silver EMI fingers located near the battery contacts.

## Step 34



- Use a spudger to pry up the end of the DC-to-DC board closest to the display and remove the board from the computer.

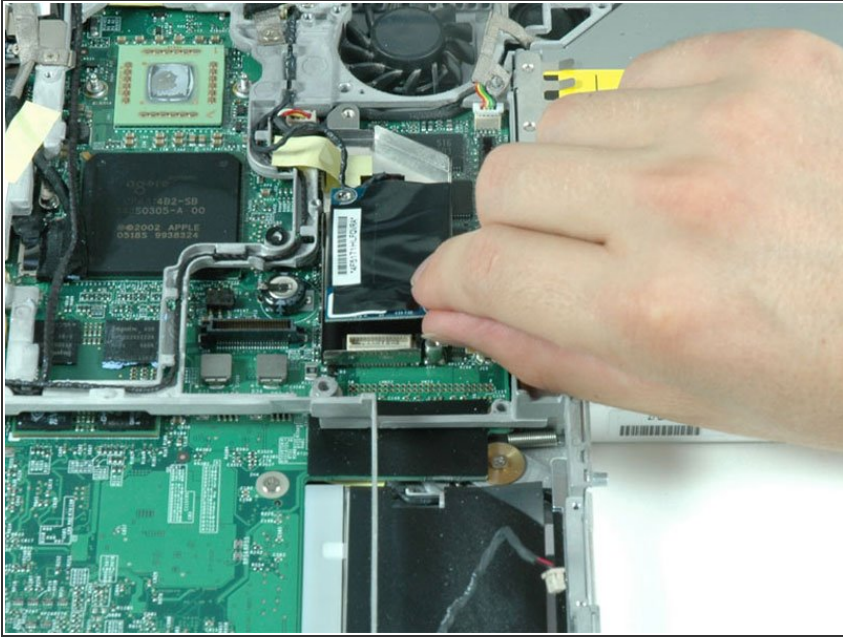
## Step 35



- Remove the three Phillips screws securing the modem and modem shield to the logic board.

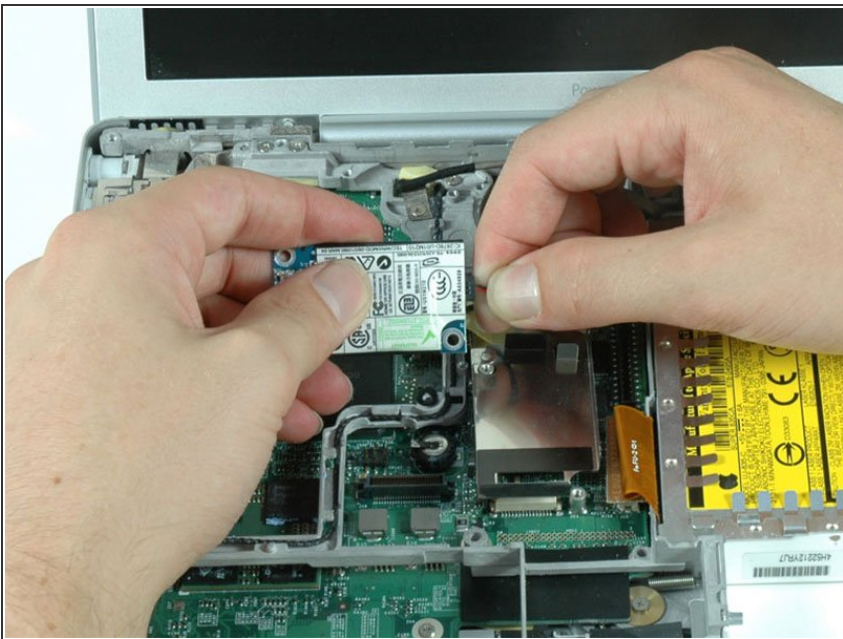


## Step 36



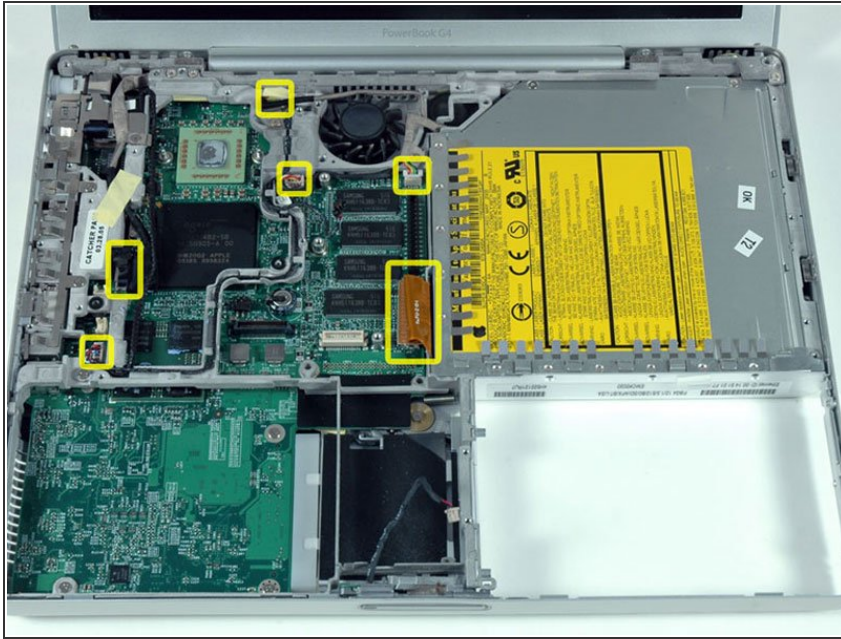
- Disconnect the modem from the logic board by lifting the bottom edge of the modem. Don't remove the modem entirely just yet as it is still connected to the RJ-11 board.

## Step 37



- Turn the modem over and disconnect the RJ-11 cable.

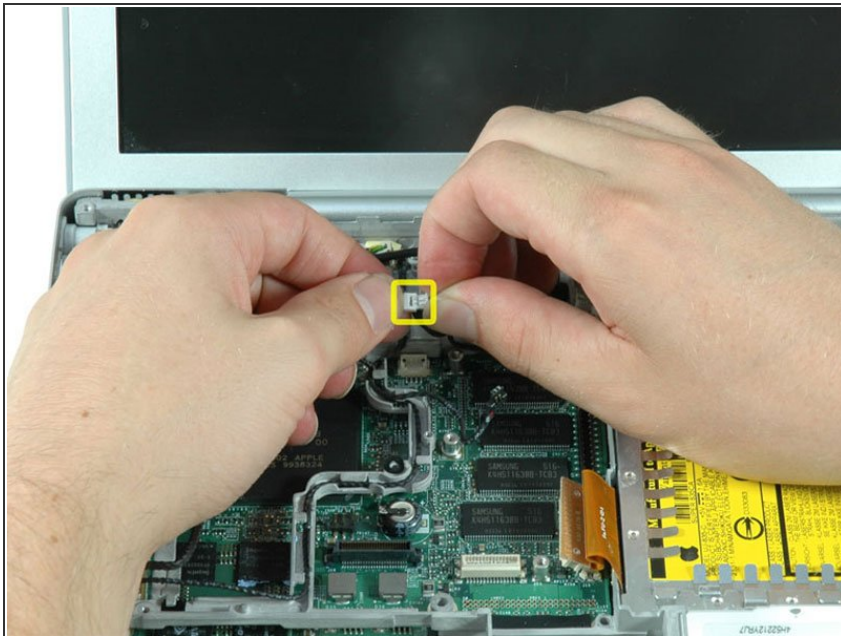
## Step 38



**⚠** The connectors at the ends of the cables are often attached very firmly to the sockets on the logic board. Pulling directly on the cable will either separate the cable from its connector or the socket from the logic board.

- Carefully disconnect six indicated connectors from the logic board. To disconnect the four white connectors, use your fingernails or a dental pick to carefully pry the connectors from their sockets. Make sure you're pulling only on the connector and not on the socket.

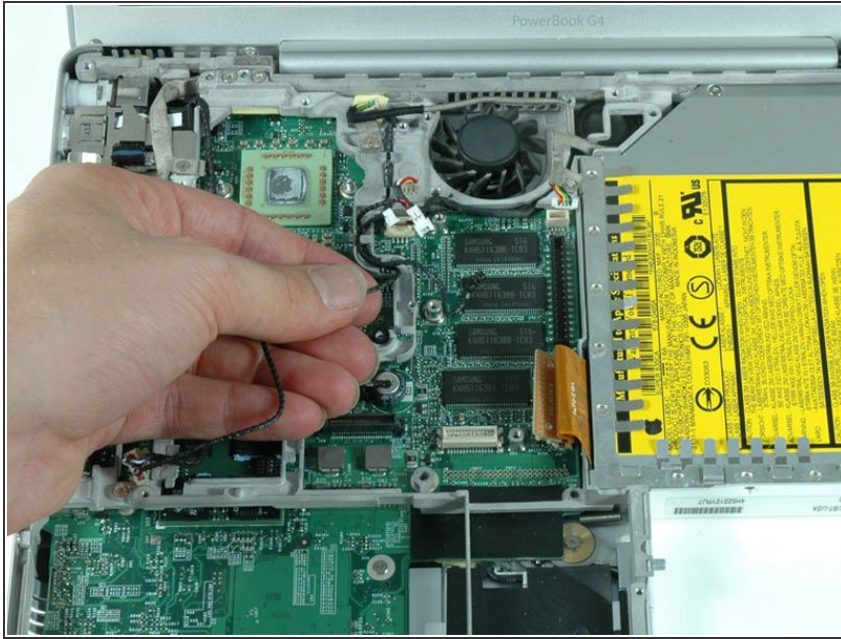
## Step 39



- Lift up middle speaker cable from the lower left corner of the fan, and disconnect the two sections of the cable.

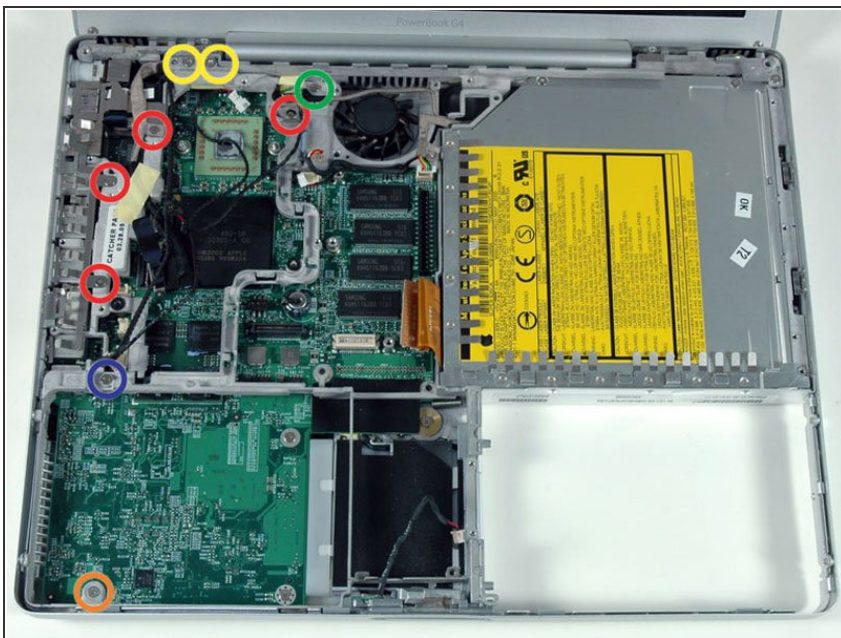


## Step 40



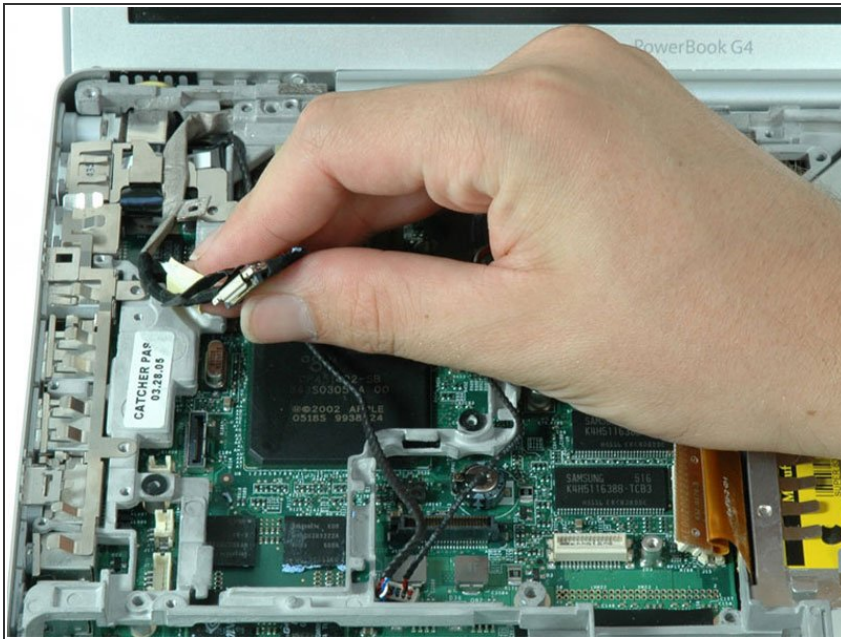
- Deroute the microphone cable from its channel in the metal framework.

## Step 41



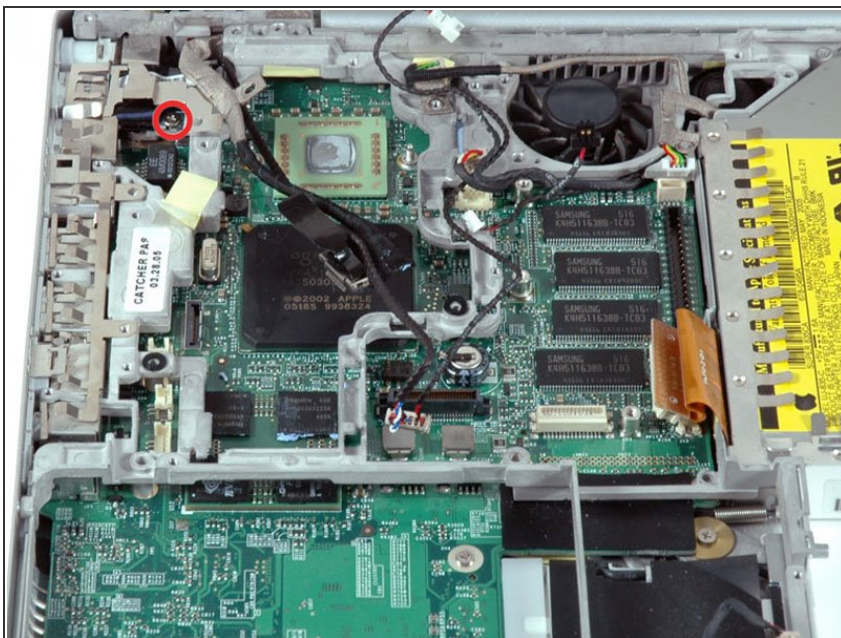
- Remove the following nine screws:
  - Four 3 mm Phillips along the left edge and near the fan.
  - One 4 mm Phillips in the bottom left corner.
  - Two 6 mm Phillips near the left hinge.
  - One 9 mm Phillips in the top left corner of the fan.
  - One 12 mm Phillips just above where the hard drive was located.

## Step 42



- Peel up the yellow tape securing the display data cable to the metal framework, and deroute the display data cable from its slot in the framework.

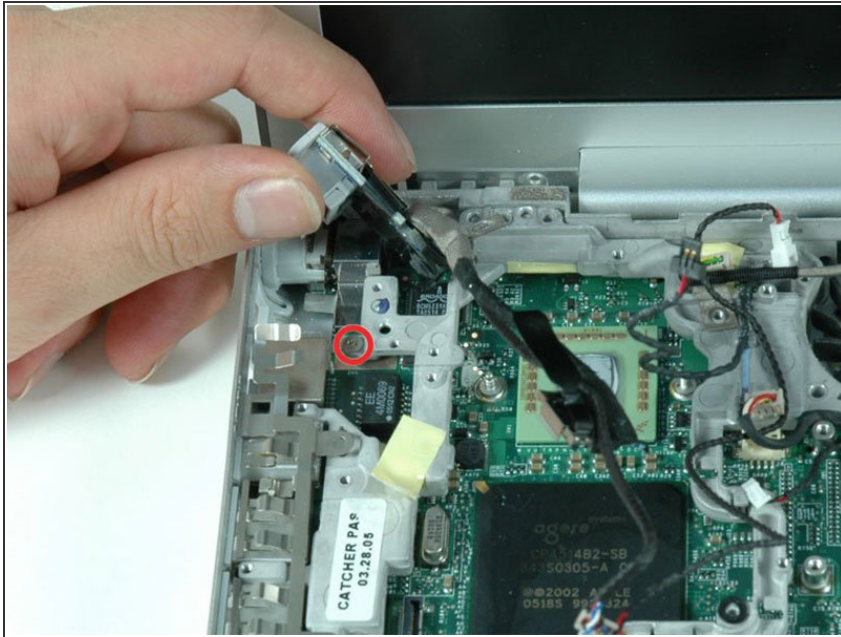
## Step 43



- Remove the newly revealed Phillips screw near the RJ-11 board.
- ⓘ Some computers may have two Phillips screws securing the RJ-11 board to the metal framework.

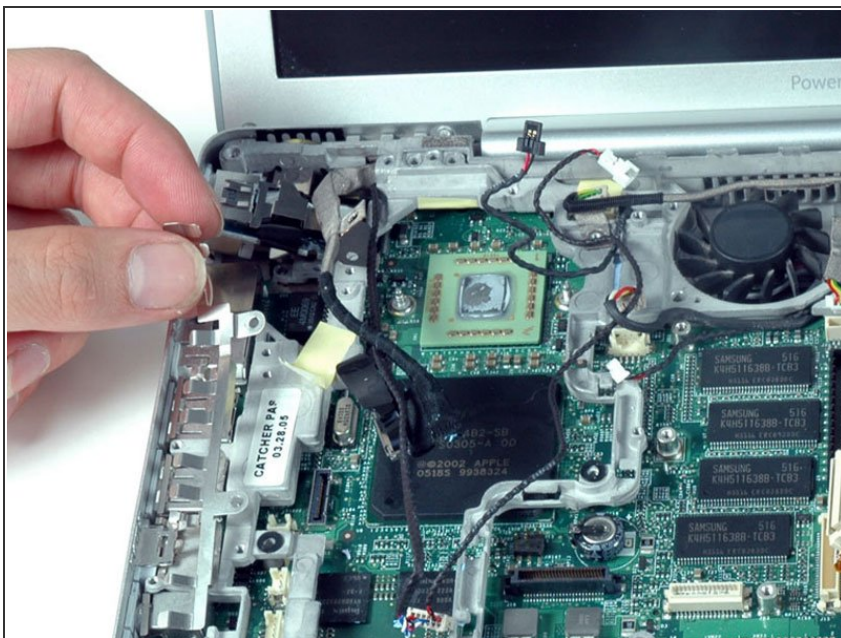


## Step 44



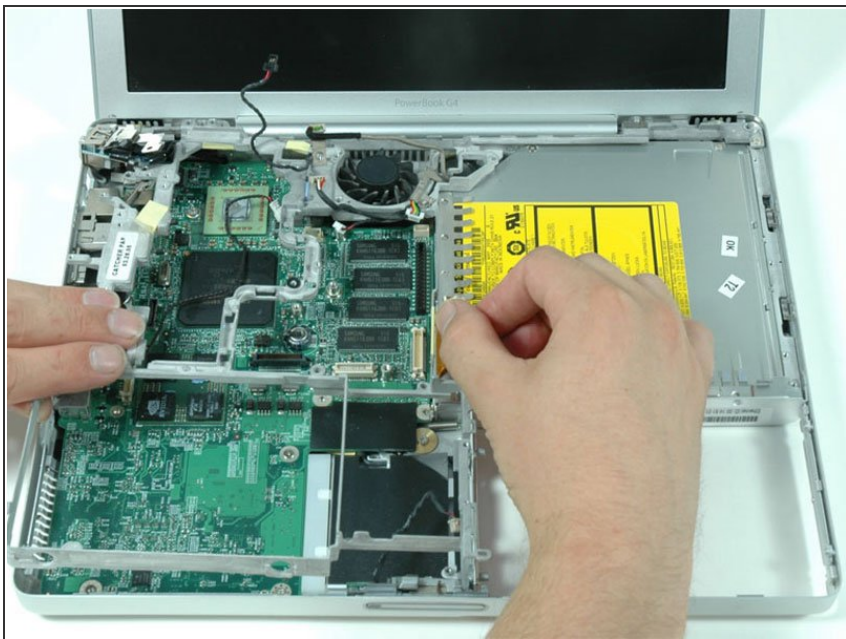
- Lift the RJ-11 board up from the left side, and remove the single Phillips screw hidden beneath.
- ⓘ You may have to remove the metal shield above the RJ-11 board before you can lift it up.

## Step 45



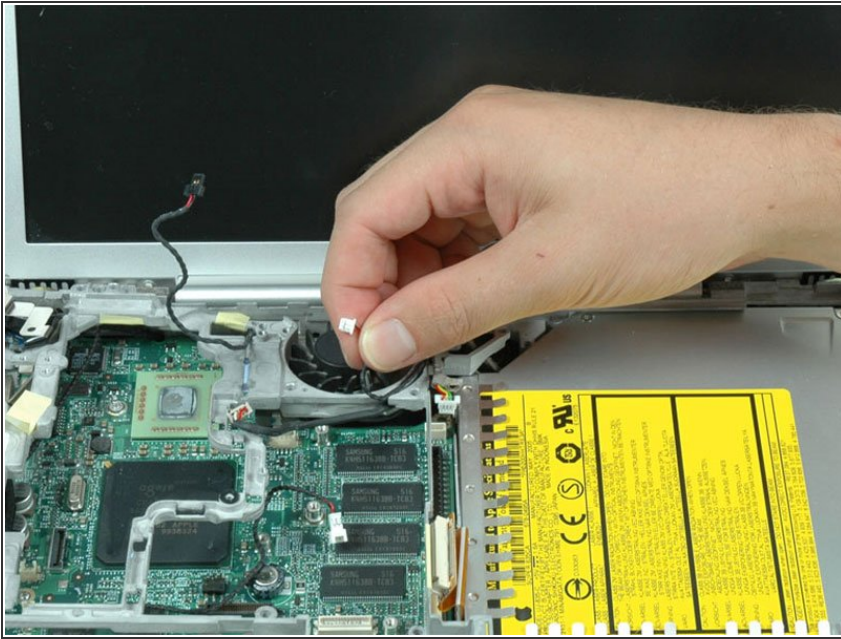
- Lift up and remove the silver EMI fingers located above the ports on the left side of the computer.

## Step 46



- Pull back on the orange optical drive cable with one hand, and use your other hand to lift the front section of the metal framework over the optical drive cable.

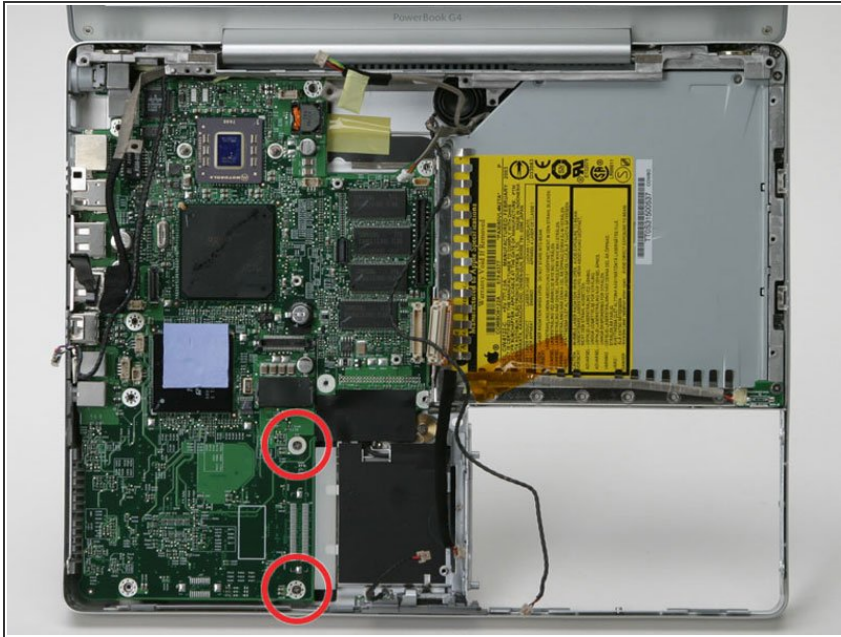
## Step 47



- Deroute the microphone cable from its channel in the upper right corner of the framework.
  - The metal framework should now be free and can be removed from the computer. Be careful when removing the metal framework that none of the cables get caught on the framework.
- ★ When reassembling the laptop, make sure that two wires come through the loop of metal on the frame on the upper right-hand side - a silver wire at right angles and the skinny black microphone channel. The third wire from underneath the frame is routed over the fan. The fourth wire from this corner is directly attached to the frame.

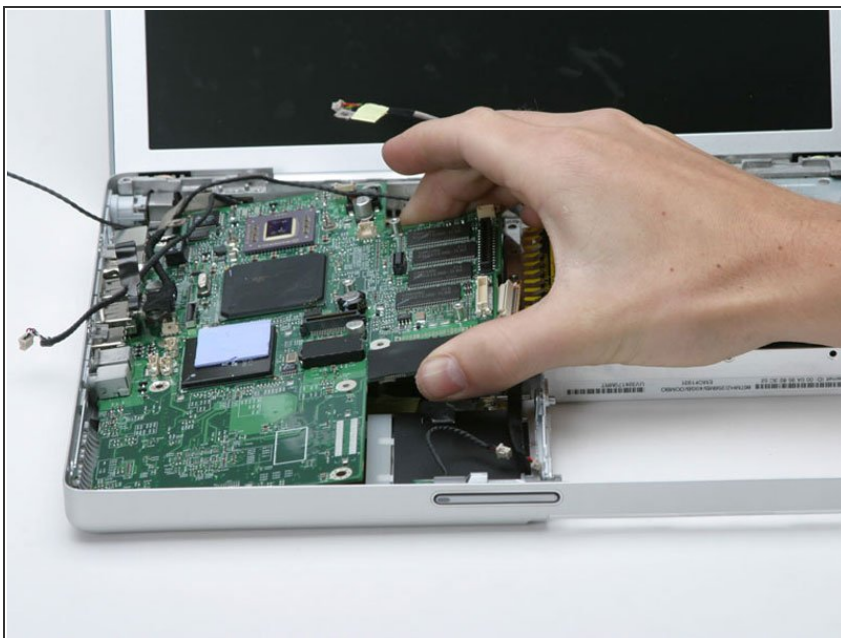


## Step 48 — Logic Board



- Remove the two Phillips screws from the bottom right of the logic board.
- ✦ When reassembling, take note of the plastic piece immediately to the right of the screws. Make sure you do not neglect to put it in place before screwing down the logic board.

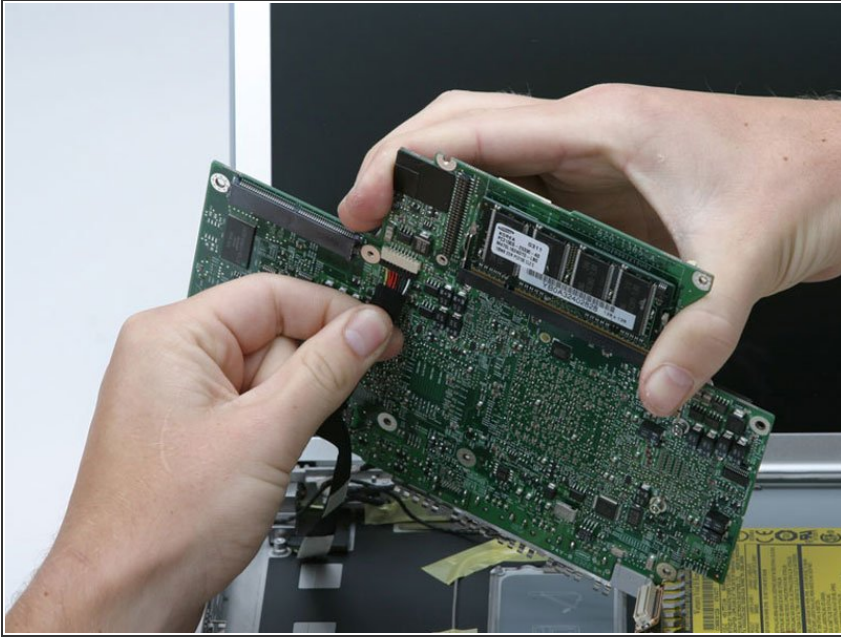
## Step 49



- ⓘ Do not lift the logic board out completely without first disconnecting the DC-In connector underneath the logic board.
- Lift the logic board partly up from the optical side.

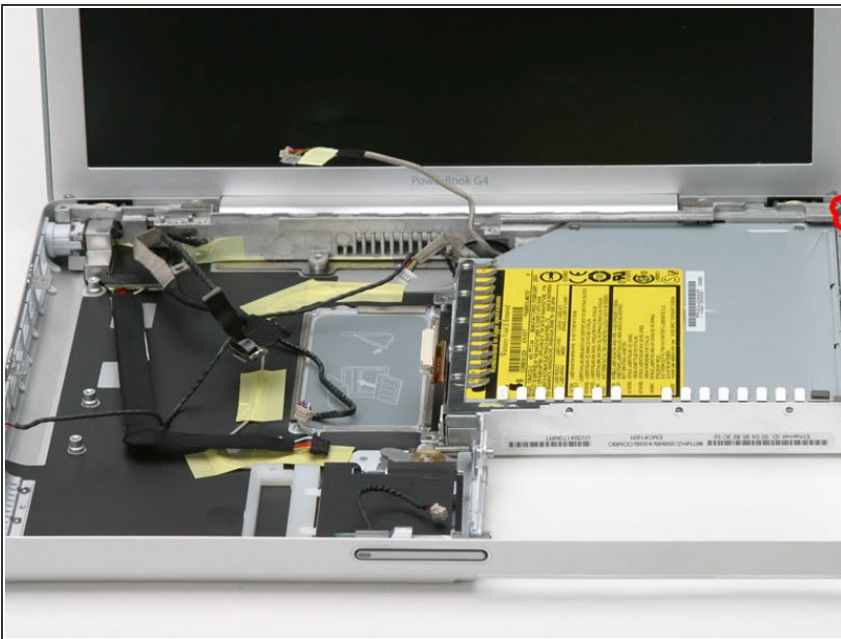


## Step 50



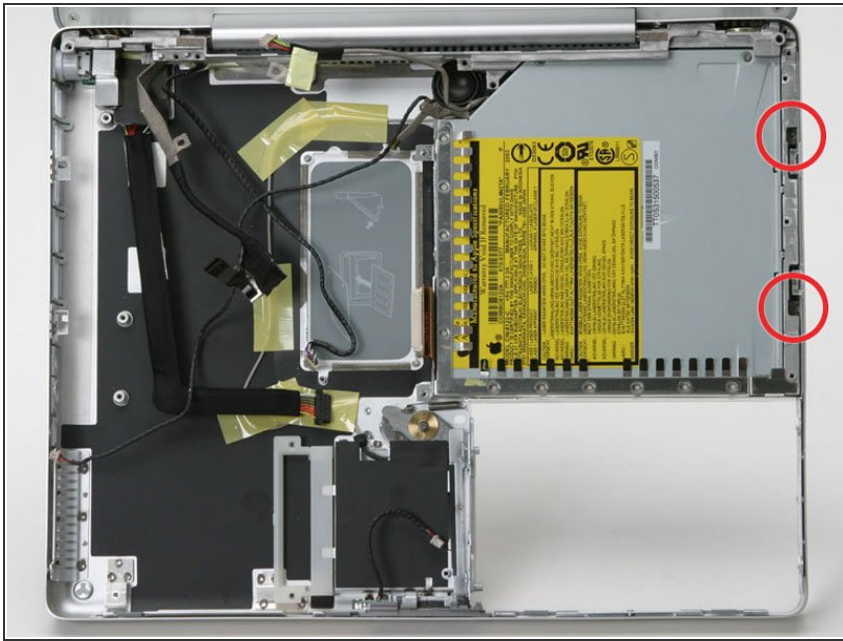
- Disconnect the DC-In connector from the underside of the logic board.

## Step 51 — Optical Drive



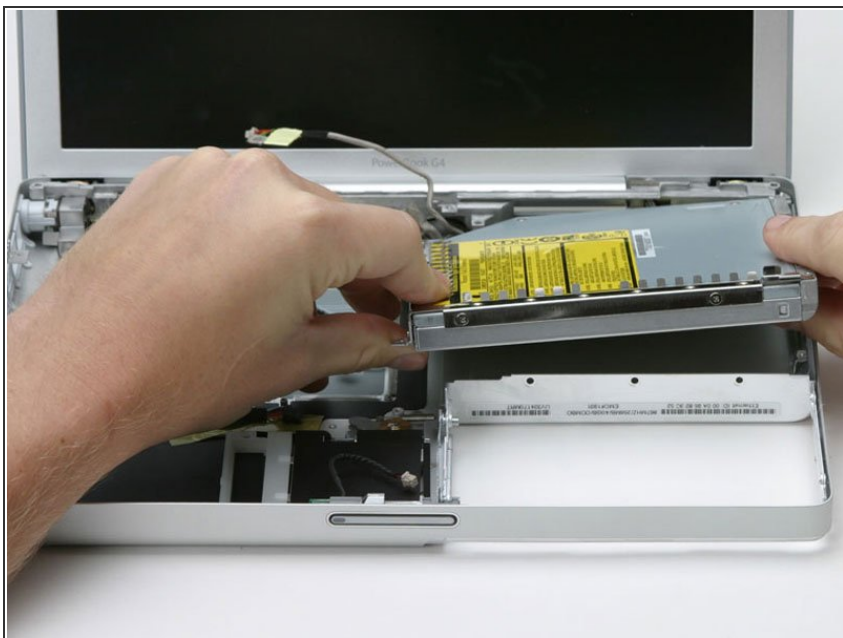
- Remove the two 6mm Phillips screws from the upper right corner of the computer.
- Remove the newly-liberated small metal bracket.

## Step 52



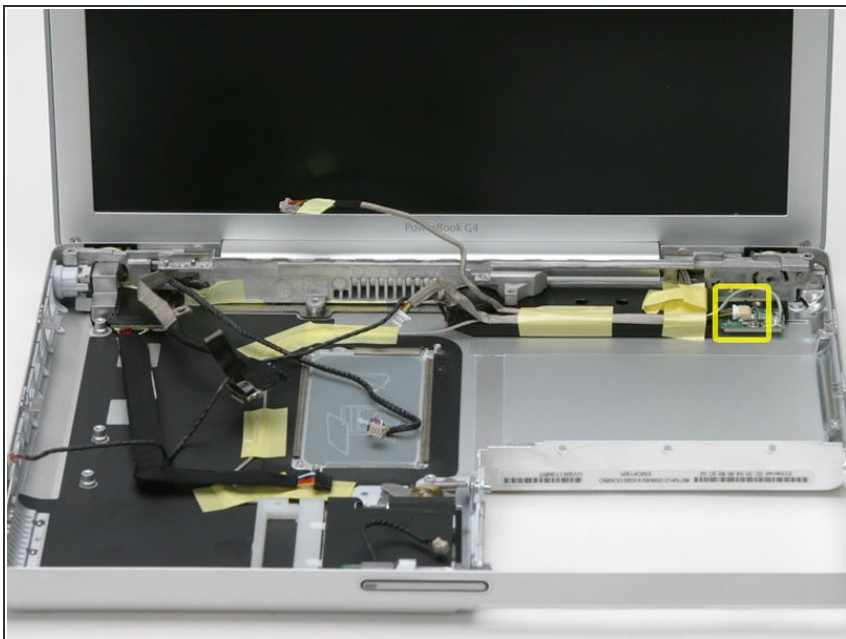
- Remove the two recessed Phillips screws on the right side of the optical drive.

## Step 53



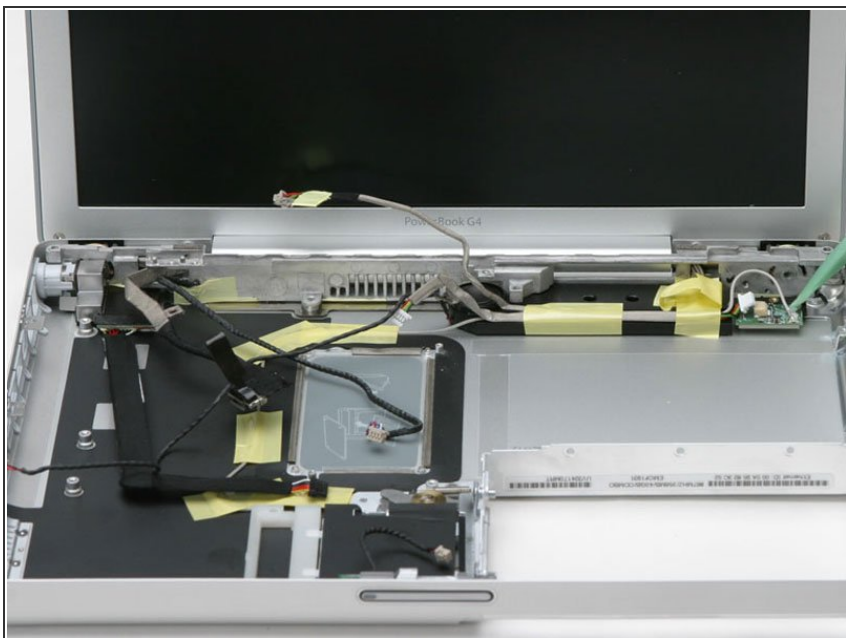
- Lift the optical drive up by its front left corner and pull it out of the computer.
- ⓘ If you have a CD or any other object jammed in your optical drive, we have an [optical drive repair guide](#).

## Step 54 — Bluetooth



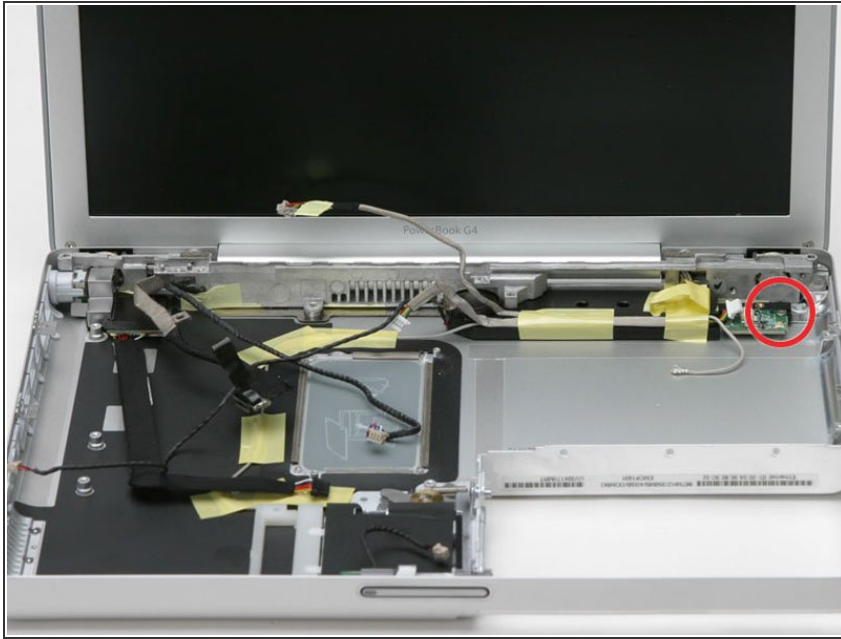
- Disconnect the multicolor connector by sliding it to the left.

## Step 55



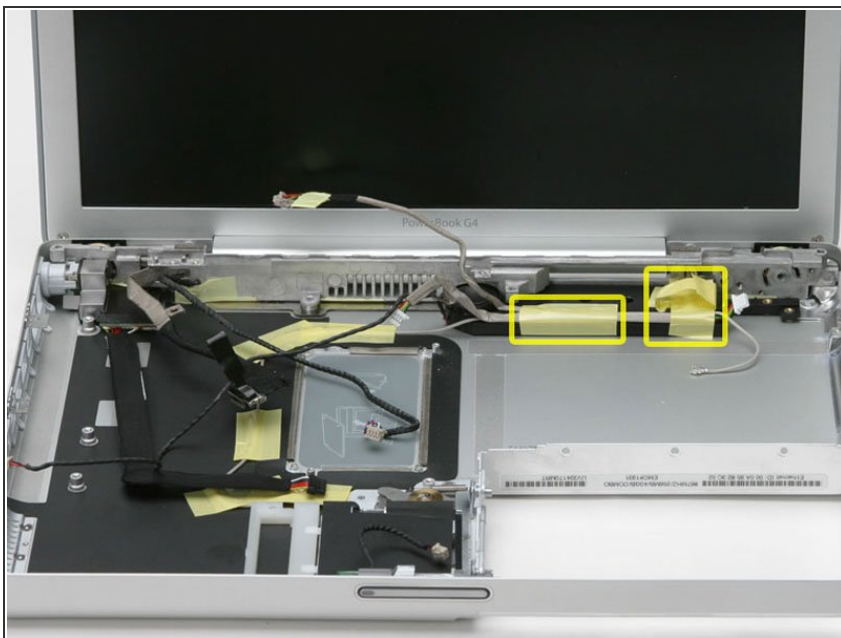
- Disconnect the silver bluetooth cable by pulling directly up.

## Step 56



- Remove the single Phillips screw from the right side of the board.
- Lift the bluetooth board out of the computer.

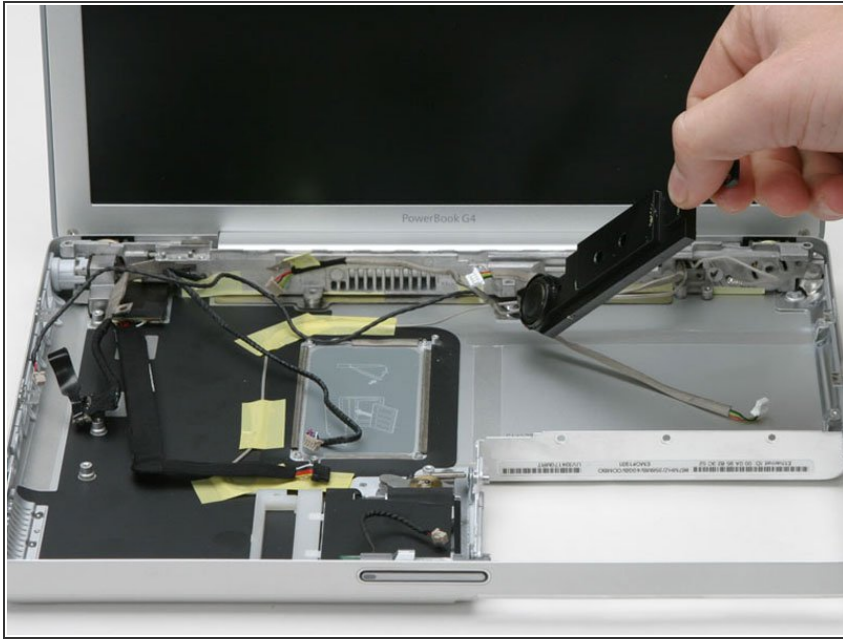
## Step 57 — Subwoofer



- Peel back the yellow tape from the right side of the subwoofer.
- Remove the single Phillips screw from the right side of the subwoofer, under the tape you just removed.
- Remove the yellow tape that secures the remaining cables to the side of the subwoofer.

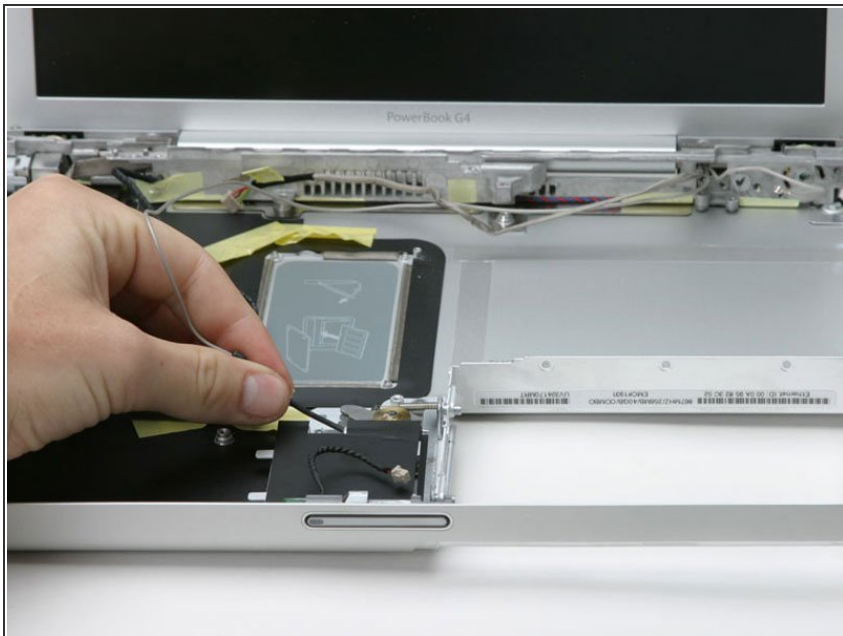


## Step 58



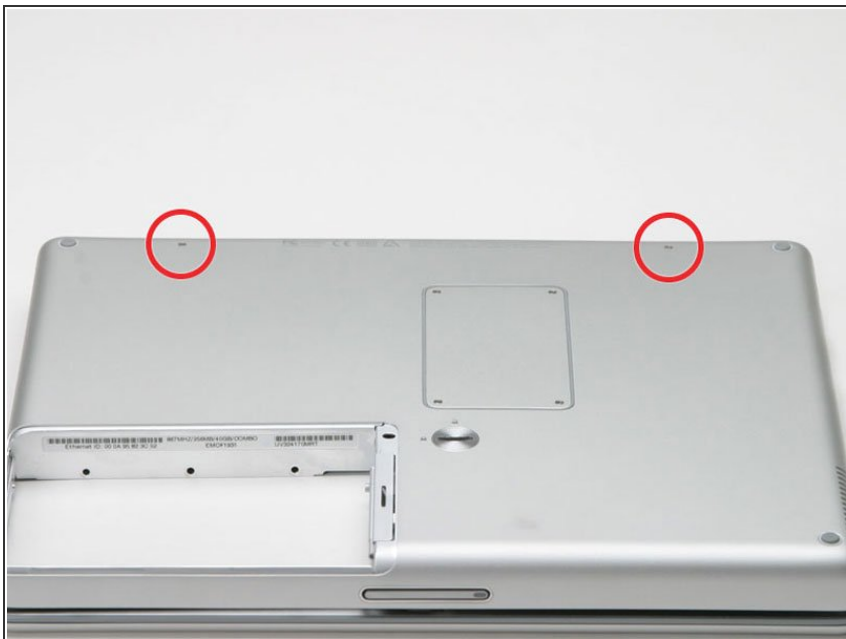
- Slide the subwoofer away from the screen and out of the computer.
- ⓘ The subwoofer is adhered to the case, so a little force may be required.

## Step 59 — Display



- Deroute the Airport Extreme antenna from the card slot and lower case, removing tape as necessary.

## Step 60



- Place a cloth between the screen and the bottom case.
- Close the bottom case and turn the laptop over.
- Remove the two Phillips screws from the bottom case.

## Step 61



- Remove the two Phillips screws from either side of the display hinge.

## Step 62



- Grasp the lower case and push down on the hinge side while rotating the other end of the case toward you until it pops free, then remove it entirely (leaving the display).

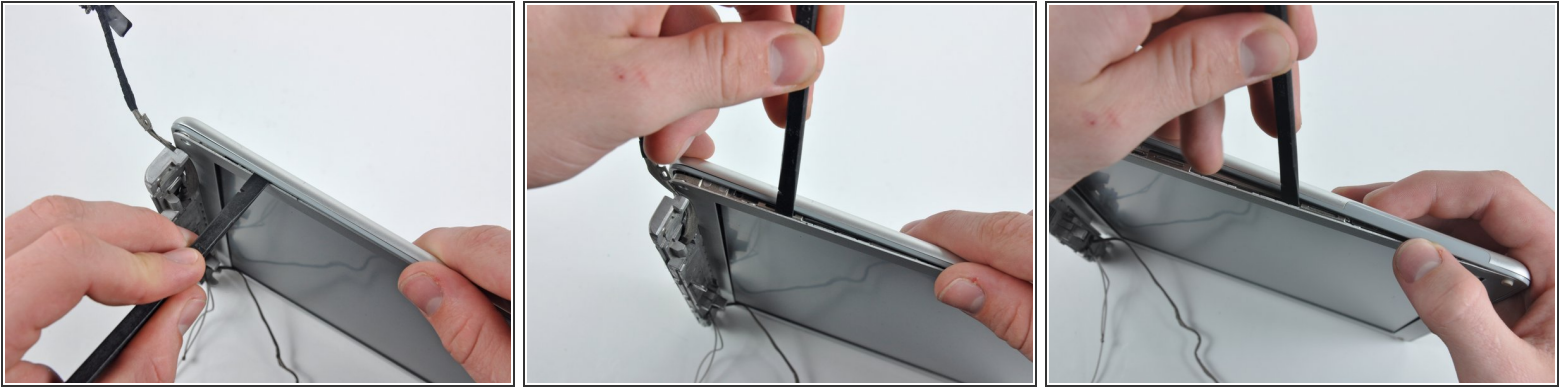
ⓘ You have effectively removed the computer from the display.

## Step 63 — Rear Display Bezel



- Remove the two T6 Torx screws in the lower left and lower right corners of the display securing the rear bezel to the display assembly.

## Step 64



- Insert the spudger between the left edge of the front display bezel and the plastic strip attached to the rear bezel, with the edge of the tool angled toward the LCD.
- Rotate the tool away from the LCD to pop the rear bezel off the tabs on the front display bezel.
- Work along the left edge of the display until the rear bezel is evenly separated from the front bezel.



## Step 65



- Insert a spudger between the right edge of the front display bezel and the plastic strip attached to the rear bezel, with the edge of the tool angled toward the LCD.
- Rotate the tool away from the LCD to pop the rear bezel off the tabs on the front display bezel.
- Work along the right edge of the display until the rear bezel is evenly separated from the front bezel.


## Step 66



- Insert a spudger between the top edge of the front display bezel and the plastic strip attached to the rear bezel, with the edge of the tool angled toward the LCD.
- Rotate the tool away from the LCD to pop the rear bezel off the tabs on the front display bezel.
- Work along the top edge of the display until the rear bezel is evenly separated from the front bezel.

## Step 67



- Insert a spudger in the space between the front bezel and the rear display bezel near the top left corner.
  - Release the clip by rotating the spudger away from the screen.
  - Repeat this process on the top right corner of the display.
-  These clips are especially tough to undo, and may take some extra force to remove them.

## Step 68

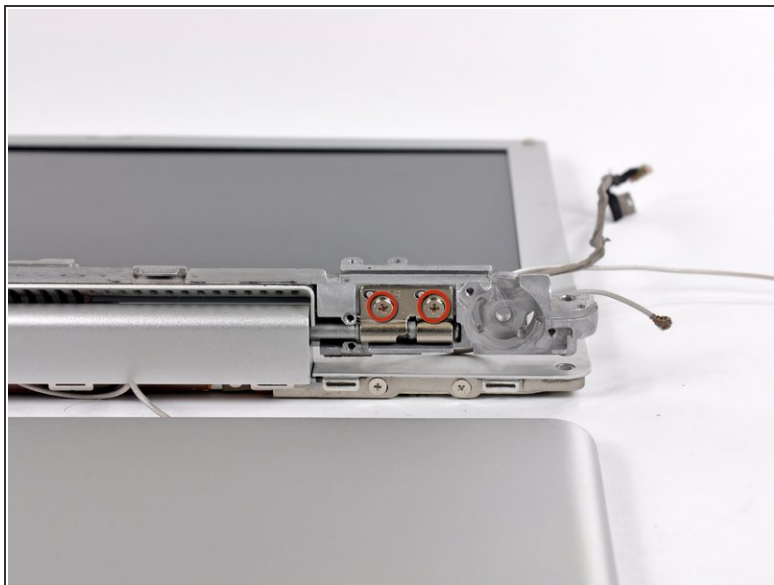
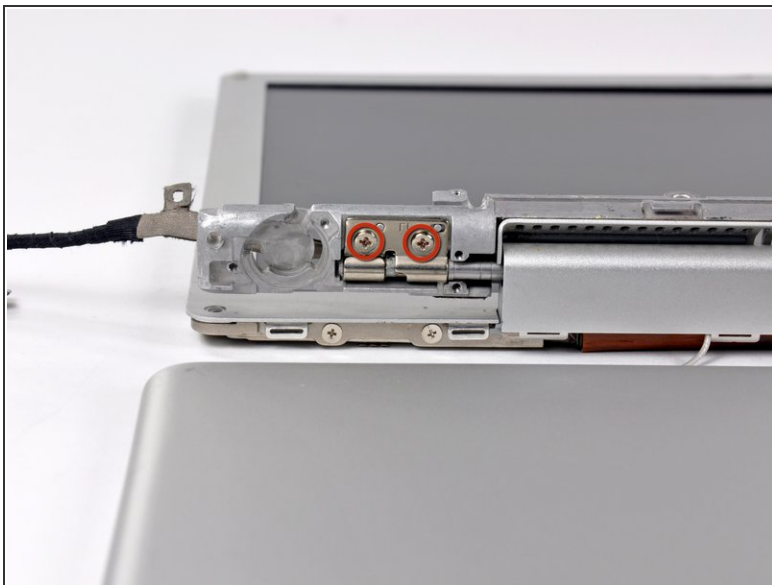


- Lift the top edge of the rear display bezel slightly.
- Slide the rear display bezel away from you to undo the last few clips.
- Rotate the rear display bezel off, and lay it next to the display.

**⚠ The rear bezel is still connected to the display via ribbon cables on the bottom edge.**



## Step 69 — Clutch Cover



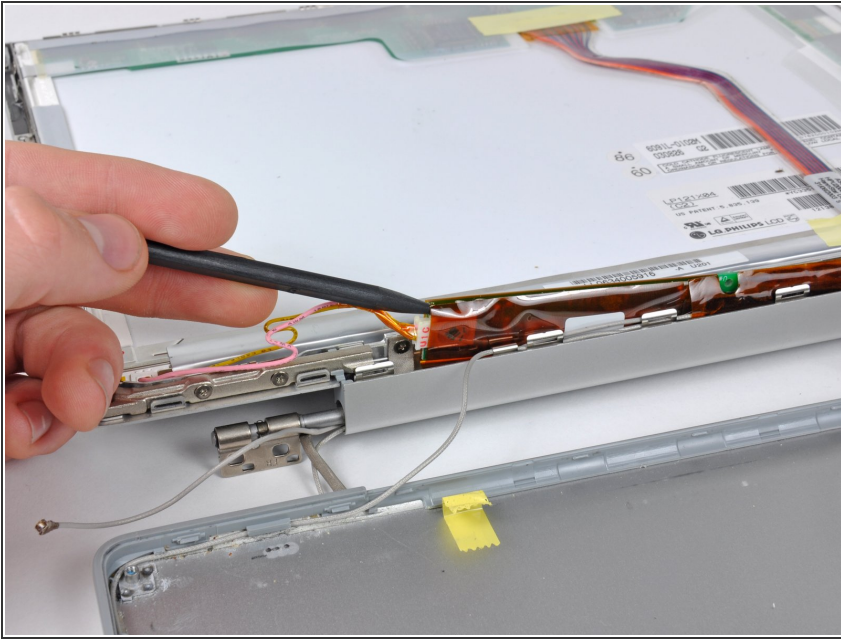
- Flip the device over and remove the two 4.5 mm Phillips screws on each side of the metal bracket (four screws in total).
- Thread the display inverter, antenna, and display data cables through the bracket and remove the metal bracket.

## Step 70



- Flip the device over.
- Remove the 5.5 mm Phillips screw connecting the display inverter to the front display bezel.

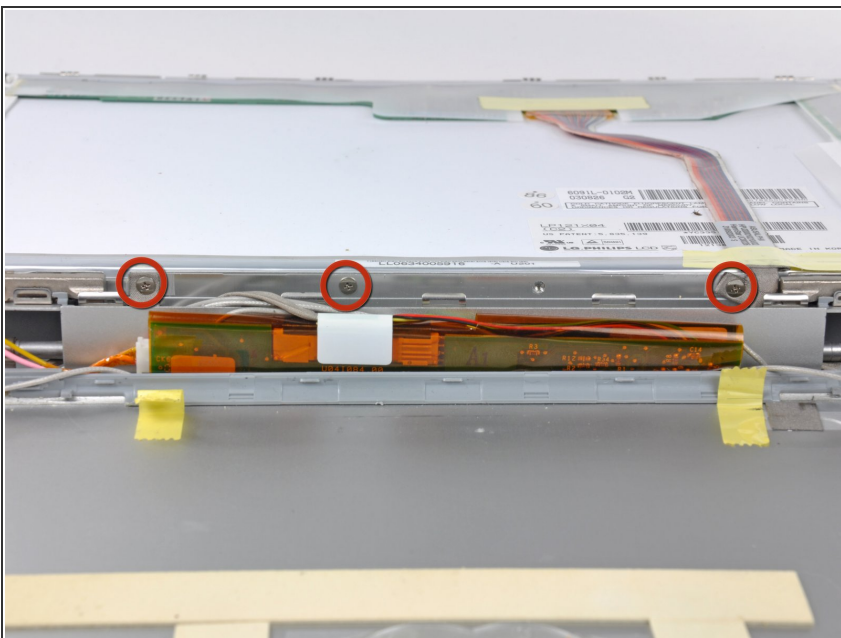
## Step 71



**⚠** The inverter is an extremely thin circuit board that is very delicate and easily cracked. Take care when handling.

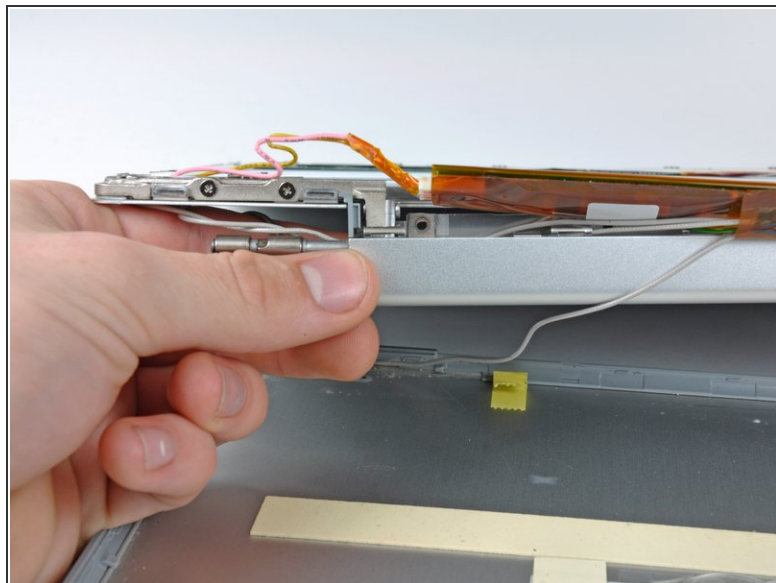
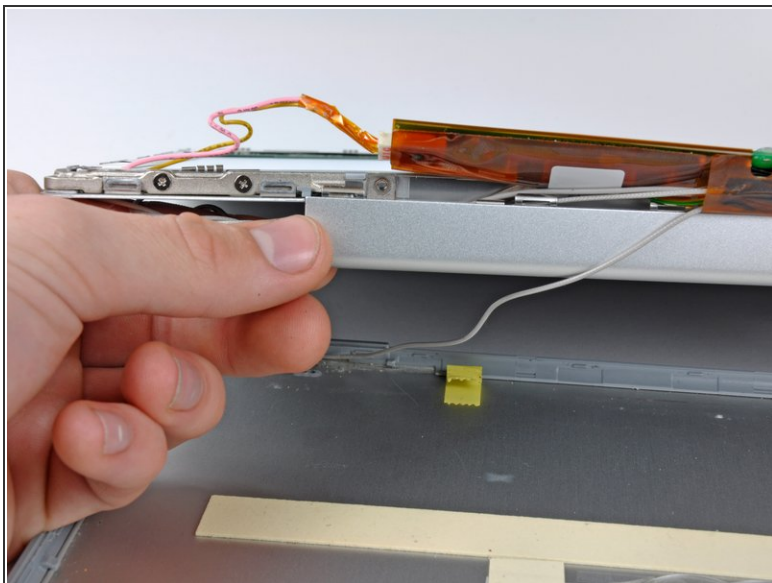
- Using the pointed end of a spudger, lift the display inverter out of the clutch cover.

## Step 72



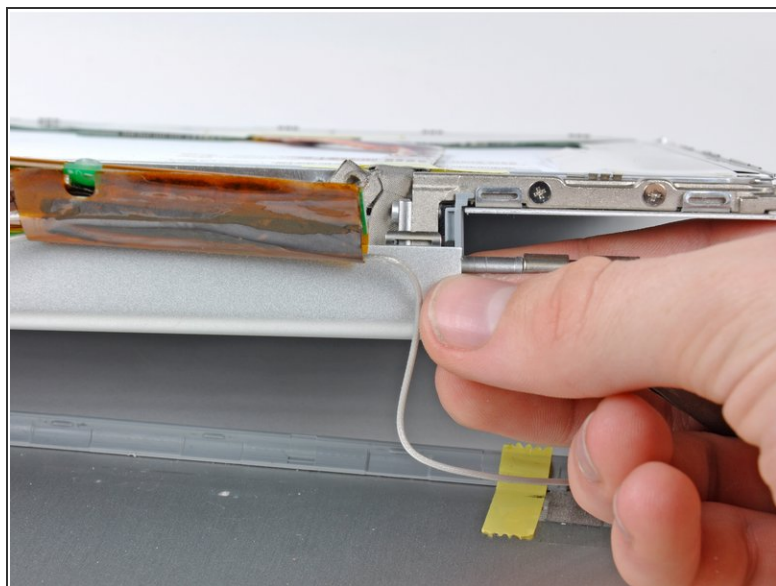
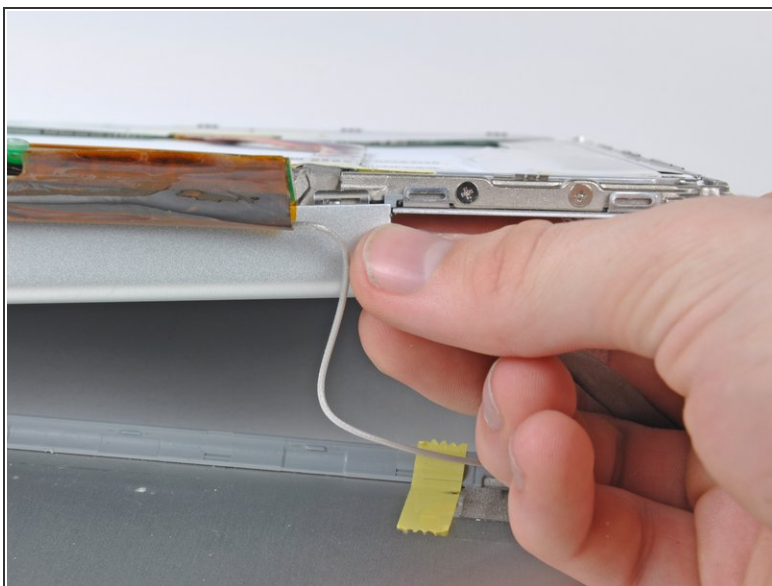
- Remove the three 3.0 mm Phillips screws connecting the clutch cover to the front display bezel.

## Step 73



- Pull the left edge of the clutch cover downwards.

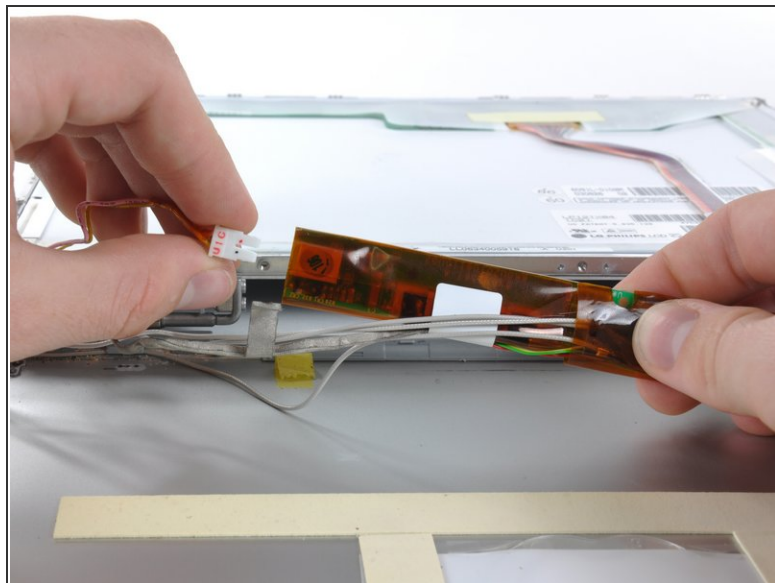
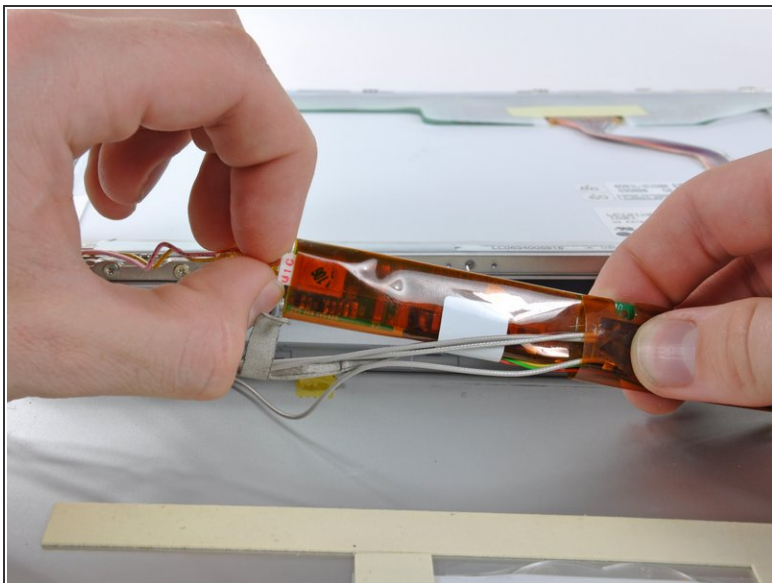
## Step 74



- Pull the right edge of the clutch cover downwards.
- Remove the clutch cover from the device.

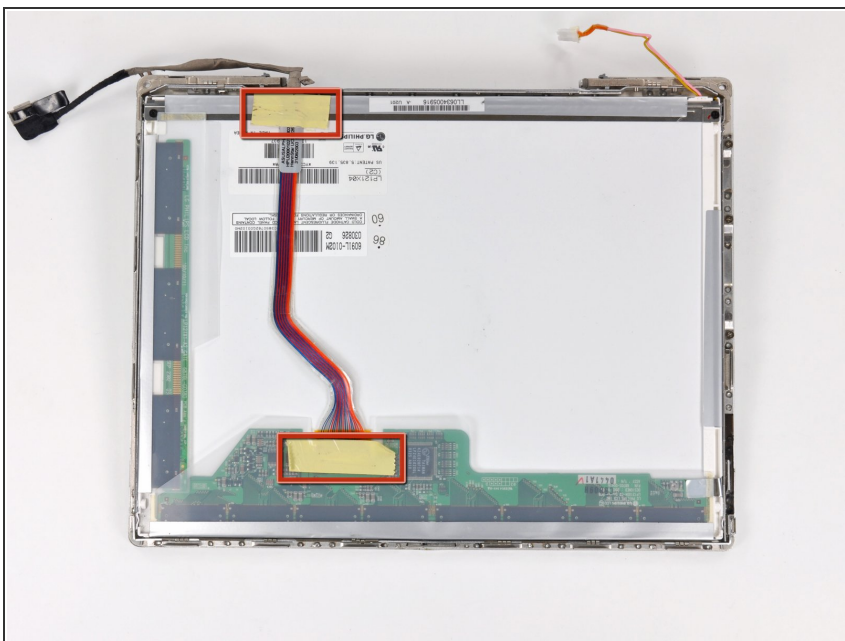


## Step 75 — LCD



- Disconnect the inverter cable by pulling the connector away from the socket on the inverter board.

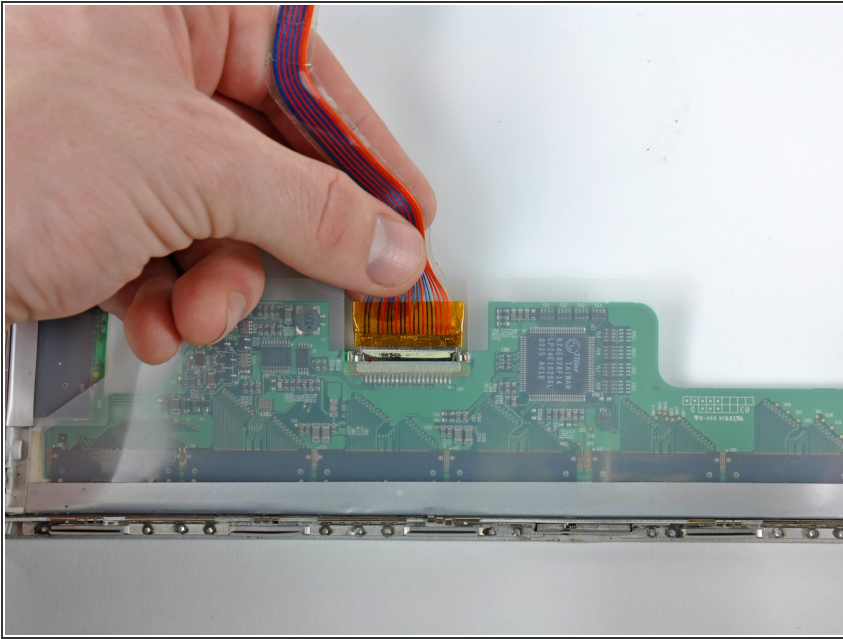
## Step 76



- Remove the two pieces of tape covering the display data cable.



## Step 77



- Pull the display data cable connector away from its socket to disconnect it from the LCD.

## Step 78



- Remove the two 3.0 mm Phillips screws securing the LCD to the left side of the front display bezel.

## Step 79



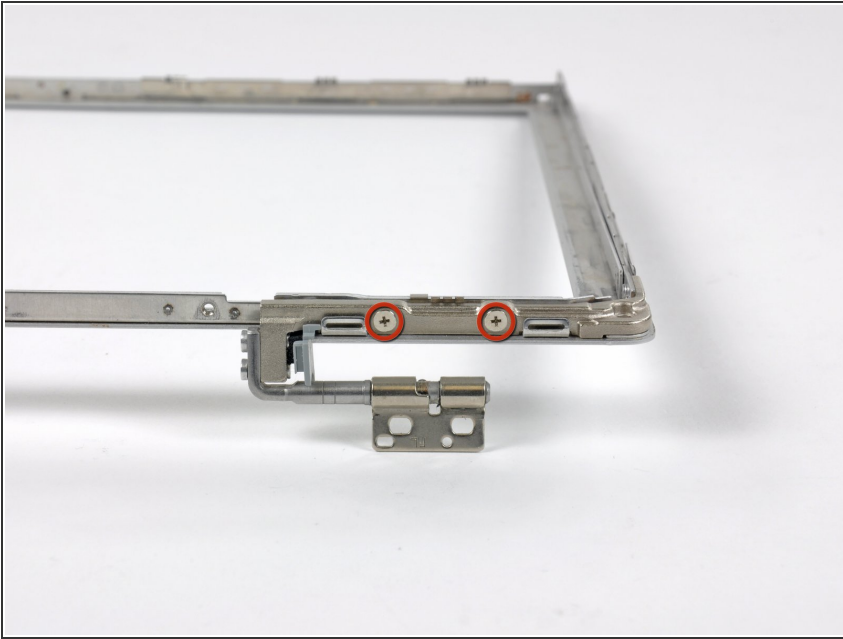
- Remove the two 3.0 mm Phillips screws securing the LCD to the right side of the front display bezel.

## Step 80



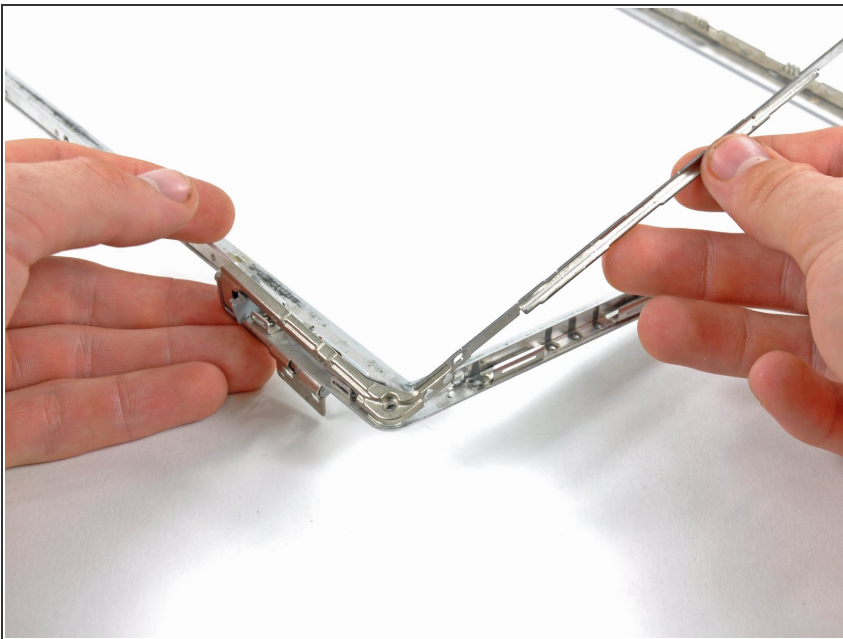
- Push the LCD away from the front display bezel.
- Remove the LCD.

## Step 81 — Left Clutch Hinge



- Remove the two 5.5 mm Phillips screws securing the left clutch hinge to the front display bezel.

## Step 82



- Lift the bar section of the clutch hinge a bit and remove the entire clutch hinge from the front display bezel.

To reassemble your device, follow these instructions in reverse order.