



Retina MacBook 2016 Battery Replacement

Use this guide to remove and replace the...

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INTRODUCTION

Use this guide to remove and replace the glued-in battery from your 12-inch MacBook with Retina Display. This is best done with the help of an iFixit battery replacement kit; the liquid adhesive remover in your kit will dissolve the adhesive securing the battery, allowing you to remove it with ease.

iFixit adhesive remover is flammable. Perform this procedure in a well-ventilated area. Do not smoke or work near an open flame during this procedure.

For your safety, drain your MacBook's battery before you begin this procedure. A charged lithium-ion battery can create a dangerous and uncontrollable fire if accidentally punctured.

The MacBook's battery contacts are located under the logic board, and this guide recommends removing the logic board completely for battery replacement. While it's possible to remove the logic board screws and simply tip the board up slightly to remove the battery, it's very difficult to install a new battery correctly with the logic board still in place.

Note: The solvent used to dissolve the battery adhesive can damage and/or discolor certain plastics. Take care where you apply the solvent.



TOOLS:

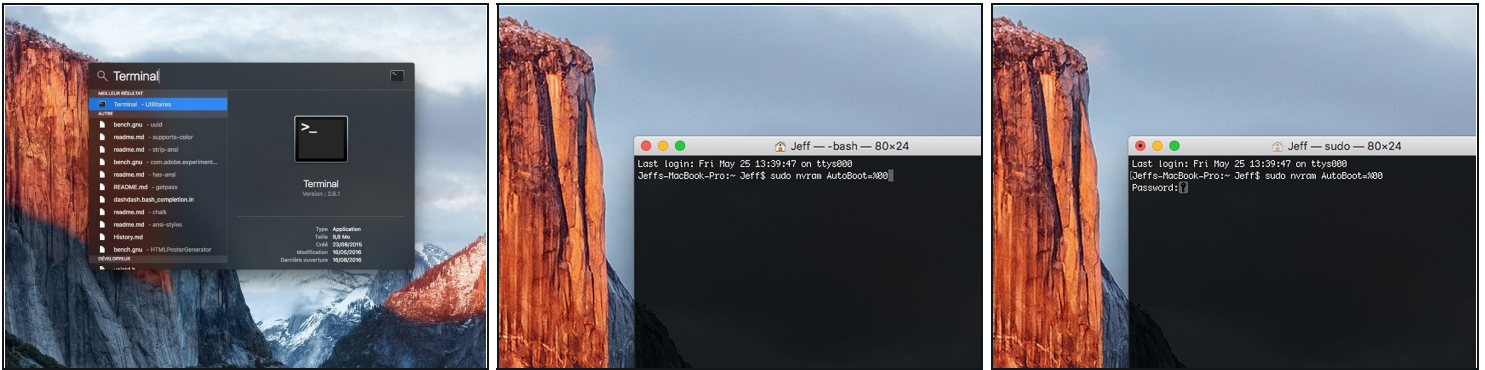
[iFixit Adhesive Remover](#) (1)
[P5 Pentalobe Screwdriver Retina MacBook Pro and Air](#) (1)
[Phillips #00 Screwdriver](#) (1)
[T5 Torx Screwdriver](#) (1)
[Plastic Cards](#) (1)
[Spudger](#) (1)
[Tweezers](#) (1)
[Battery Blocker](#) (1)
[Scissors](#) (1)
[Disposable gloves](#) (1)
[Safety Glasses](#) (1)



PARTS:

[MacBook 12" Retina \(Early 2016-2017\) Battery](#) (1)
[Tesa 61395 Double-Sided Tape](#) (1)

Step 1 — Disable Auto Boot



- ① Before starting this procedure, you must disable your Mac's **Auto Boot** feature. Auto Boot powers on your Mac when you open the lid, and may be accidentally triggered during disassembly. [Use this guide](#) or follow the abbreviated instructions below to disable Auto Boot. *This command may not work on all Macs.*
 - Power on your Mac and launch **Terminal**.
 - Copy and paste the following command (or type it exactly) into Terminal:
 - **sudo nvram AutoBoot=%00**
 - Press **[return]**. If prompted, enter your administrator password and press **[return]** again. *Note: Your return key may also be labeled ↵ or "enter."*
- ① You can now safely power down your Mac and open the bottom case, without it accidentally powering on.
- ★ When your repair is complete and your Mac is successfully reassembled, re-enable Auto Boot with the following command:
 - **sudo nvram AutoBoot=%03**

Step 2 — Unfasten the lower case



⚠ Before proceeding, unplug and power down your MacBook. Close the display and lay it on a soft surface, top-side down.

- Remove the following eight screws securing the lower case:
 - Two 1.8 mm P5 Pentalobe screws
 - Four 2.9 mm P5 Pentalobe screws
 - Two 6.1 mm P5 Pentalobe screws
- ☑ Note the orientation of the screws as you remove them—they need to be reinstalled at a slight angle.
- ☑ Throughout this repair, [keep track of each screw](#) and make sure it goes back exactly where it came from to avoid damaging your device.

Step 3



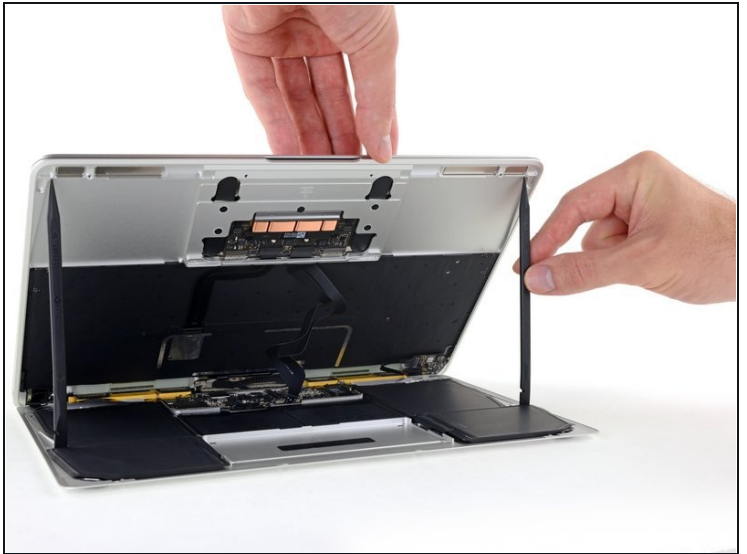
- Wedge your fingers between the upper case and the lower case, starting from the rear of the MacBook between the hinges.
- ⚠ Lift the lower case only slightly to avoid damaging the cables that connect the lower case to the upper case.
 - Keeping a firm grip, lift steadily until the lower case separates slightly from the upper case.
- ⓘ You may experience a lot of resistance when lifting the lower case. If necessary, slide an opening pick or other ESD-safe pry tool down the side edges of the lower case to pop the two hidden retaining clips free.
- ☑ During reassembly, to re-engage the clips, press firmly near both side edges of the lower case (near where the pick is inserted in the third image) until you hear the clips snap into place.

Step 4



- While holding the lower case in place, carefully flip the MacBook over so the Apple logo faces up.

Step 5



- Lift the upper case and display together from the front edge and raise it to about a 45° angle.
- ⓘ It may be helpful to prop the MacBook open in this position for the next step.

Step 6



- Use the flat end of a spudger to press and hold the small gold 'battery disconnect' button.
 - If the power LED is lit up, continue holding the button until the LED goes dark, and then release. This may take up to 10 seconds.
 - If the LED does not light, release the button after 5-10 seconds. Press and hold it again for 5-10 seconds, and release. Finally, press and hold it a third time for 5-10 seconds, and release.
- ⓘ This step ensures the MacBook is fully powered down and safe to work on.

Step 7



- Close the MacBook and carefully flip it upside-down.

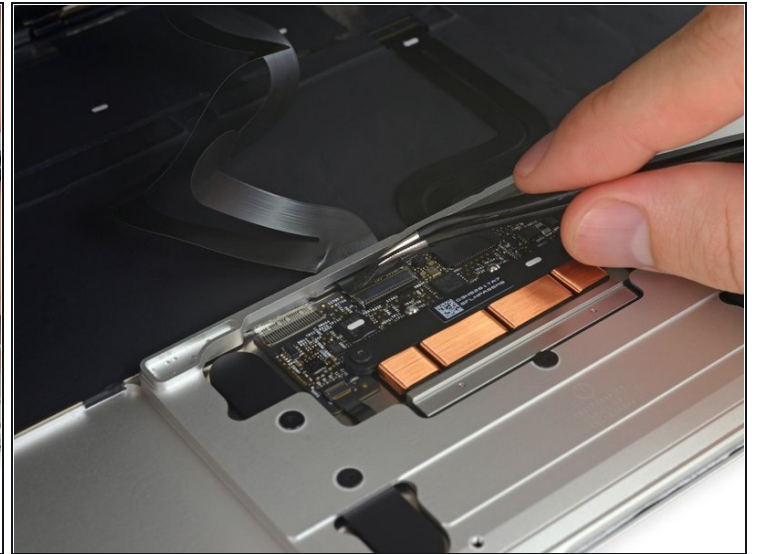
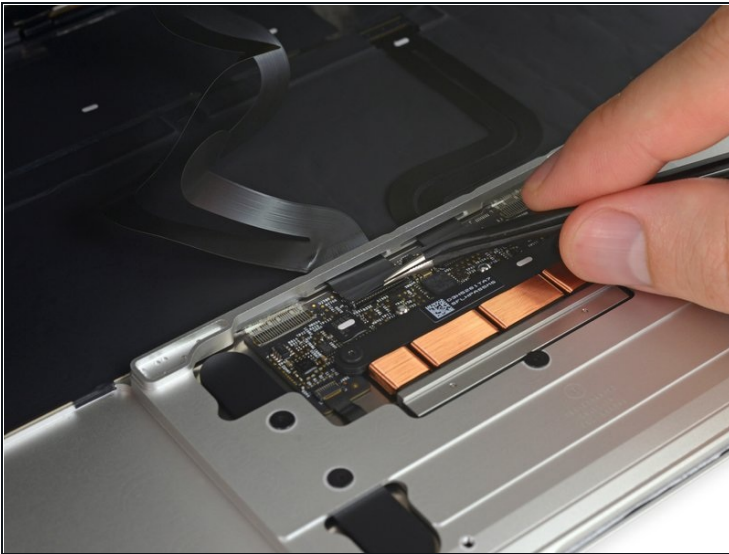
Step 8



- Lifting from the front edge, open the lower case to an angle of about 45°.

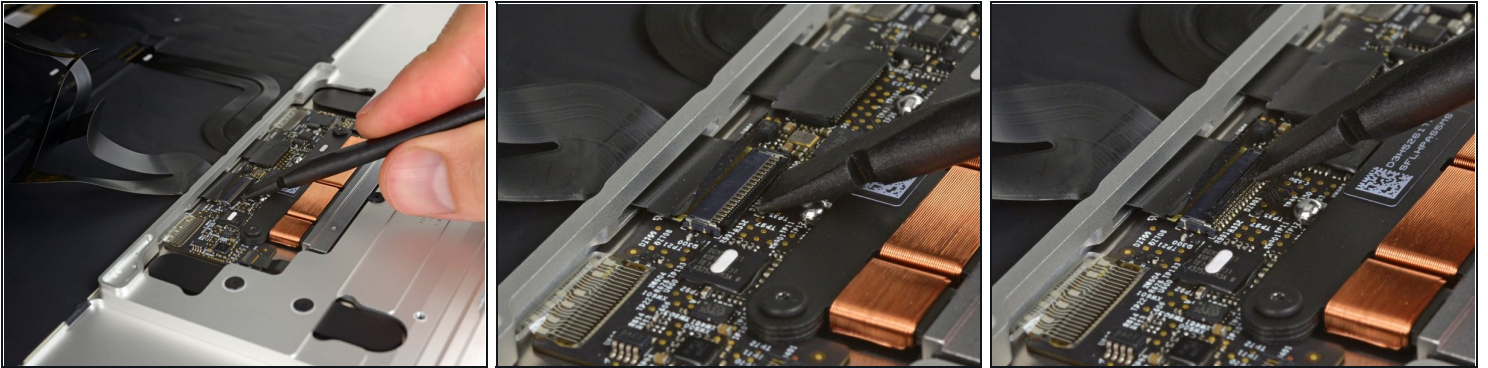
⚠ Take care not to damage the ribbon cables that still attach the lower case to the MacBook.

Step 9



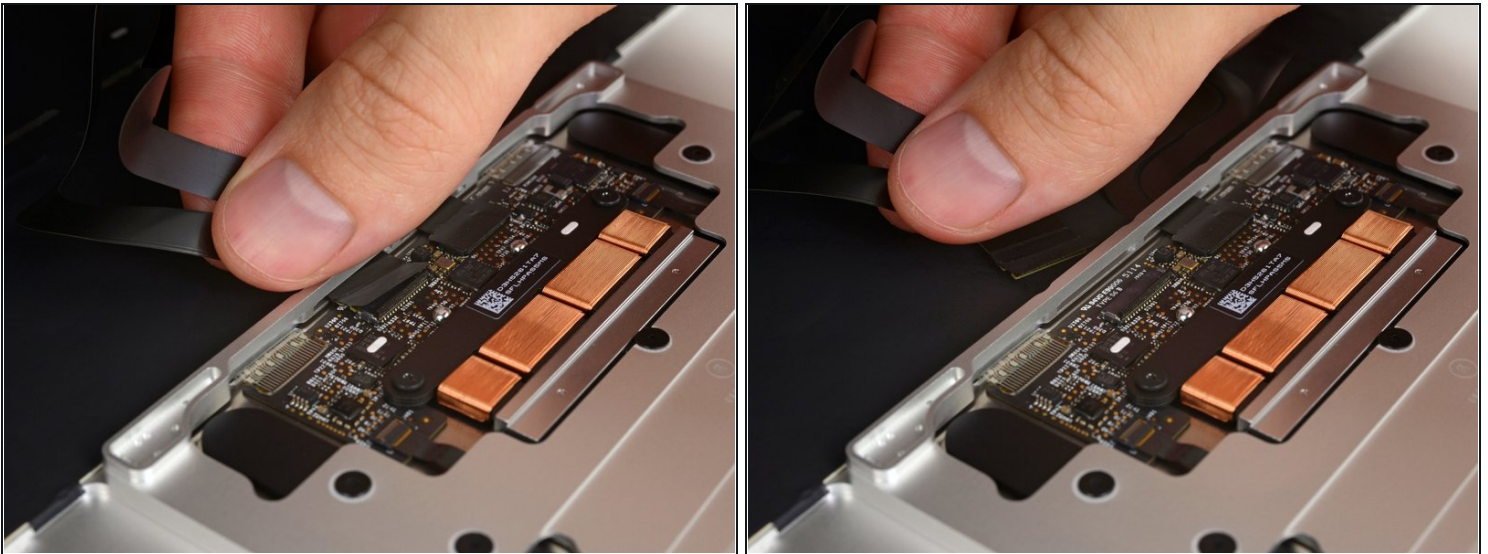
- Use tweezers to peel back the tape covering the trackpad cable ZIF connector.

Step 10



- Use a spudger to carefully flip up the retaining flap on the trackpad cable [ZIF connector](#).

Step 11



- Disconnect the trackpad ribbon cable from the trackpad by pulling it gently through its slot in the frame.

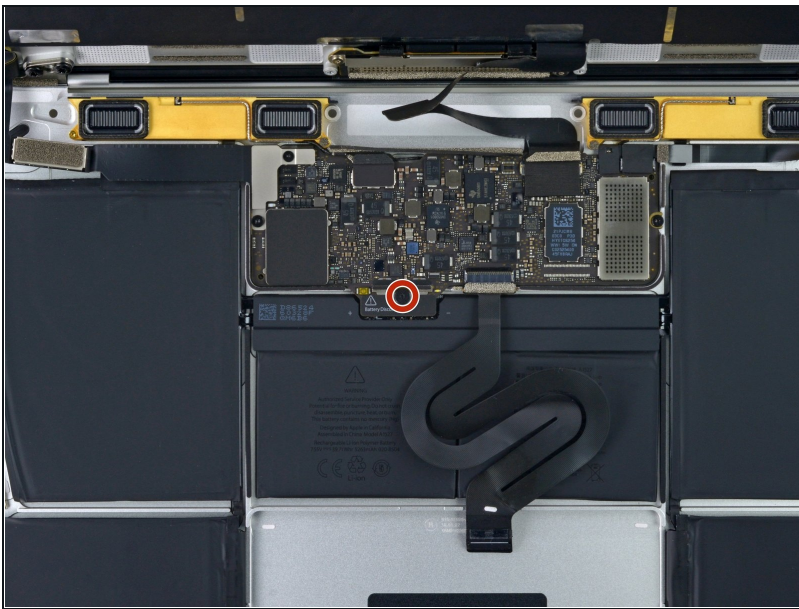
Step 12



- Carefully close the MacBook and flip it over once again, so that the Apple logo faces up.
- Lifting from the front edge, raise the upper case/display assembly to about a 90° angle, and prop it up against something sturdy so you don't have to hold it.
- Add a piece of tape near the track pad to secure the upper case and prevent accidental movement.

⚠ It's possible to open the MacBook all the way and lay both sides down flat, but this may damage the flex cables and is not recommended.

Step 13



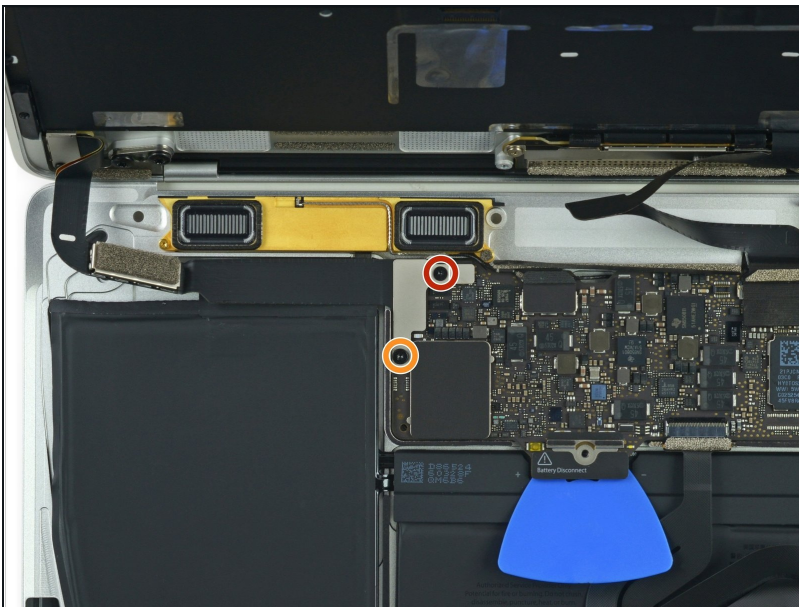
- Remove the single 2.9 mm T5 Torx screw securing the battery connector to the logic board.

Step 14



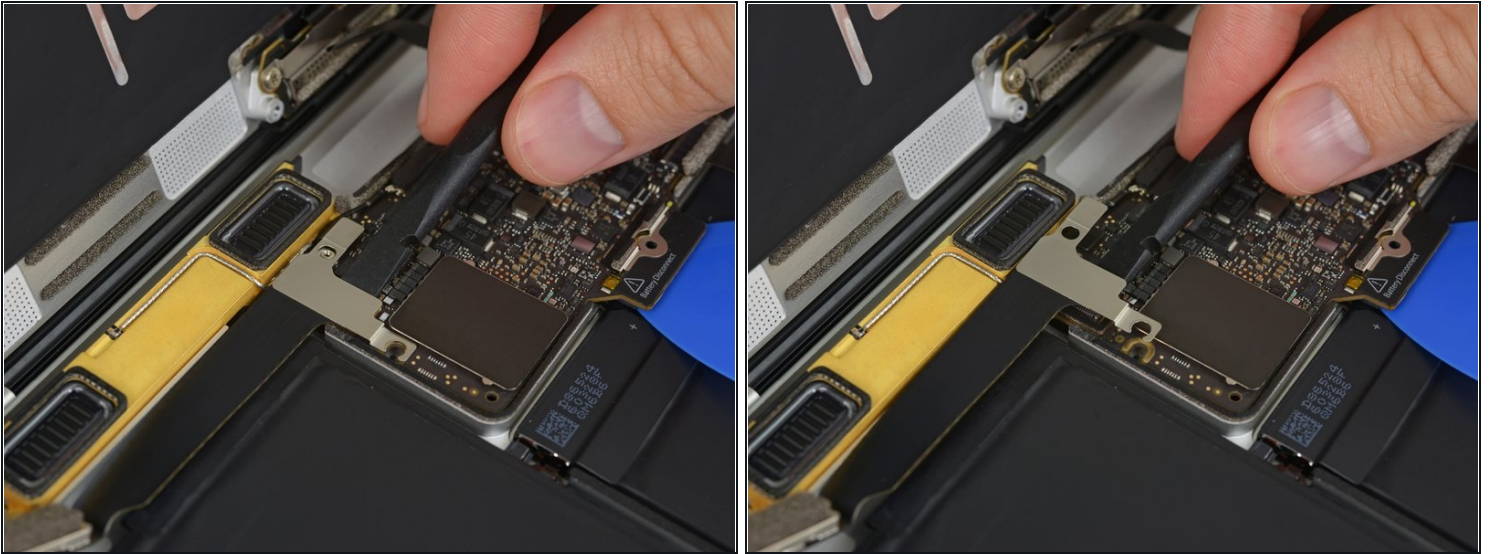
- As an added precaution, you may physically disconnect the battery by inserting a [battery isolation pick](#) between the logic board and the battery connector.

Step 15 — USB-C and Audio Jack Disconnect



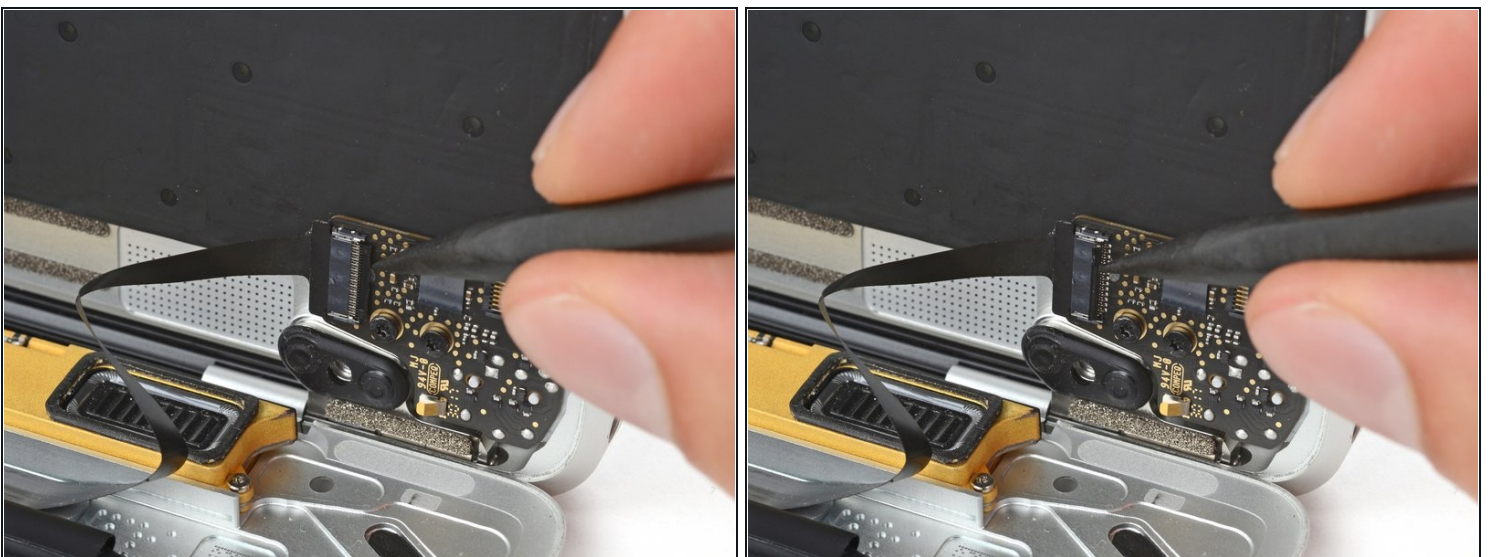
- Remove the two screws securing the USB-C port cable bracket:
 - 1.1 mm Phillips #00 screw
 - ⓘ Some variations of this model may use a Tri-point Y00 screw.
 - 3.5 mm T5 Torx screw

Step 16



- Use the flat end of a spudger to disconnect the USB-C port cable bracket by prying it straight up from the logic board.
- ☑ To reconnect this cable, first line up the metal bracket over the screw holes, then press down on the middle of the bracket. Make sure it's aligned correctly, or you may damage the connector.

Step 17



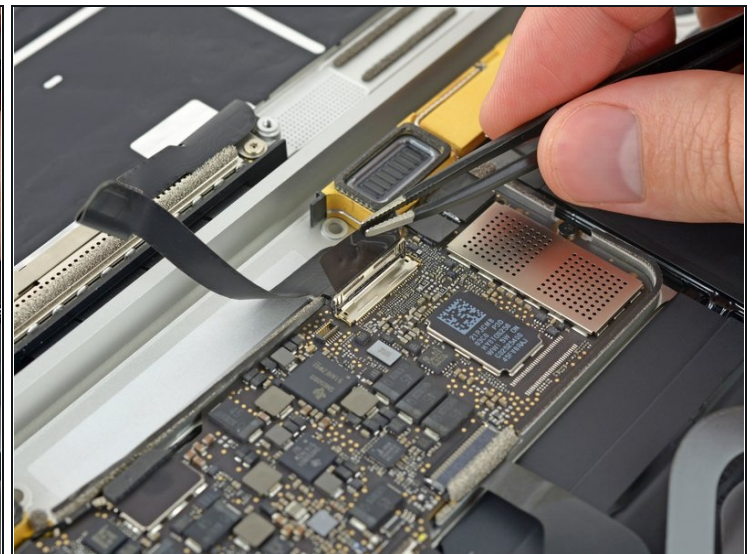
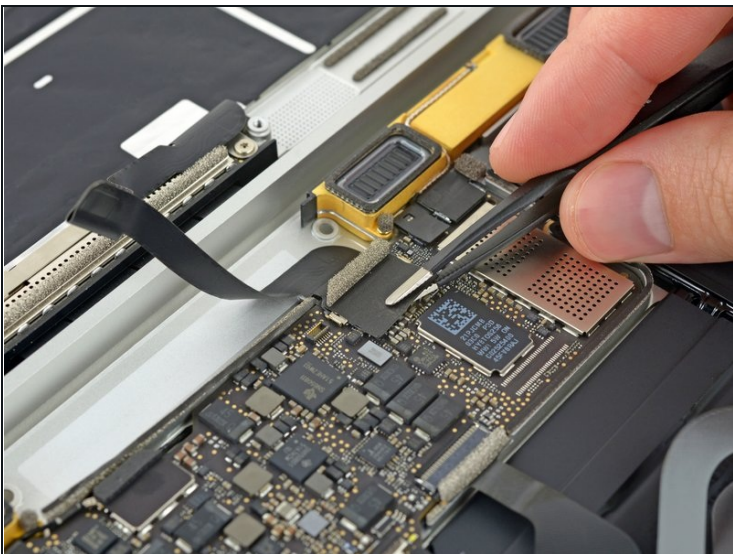
- Use a spudger to flip open the retaining flap on the audio jack board cable ZIF connector.

Step 18



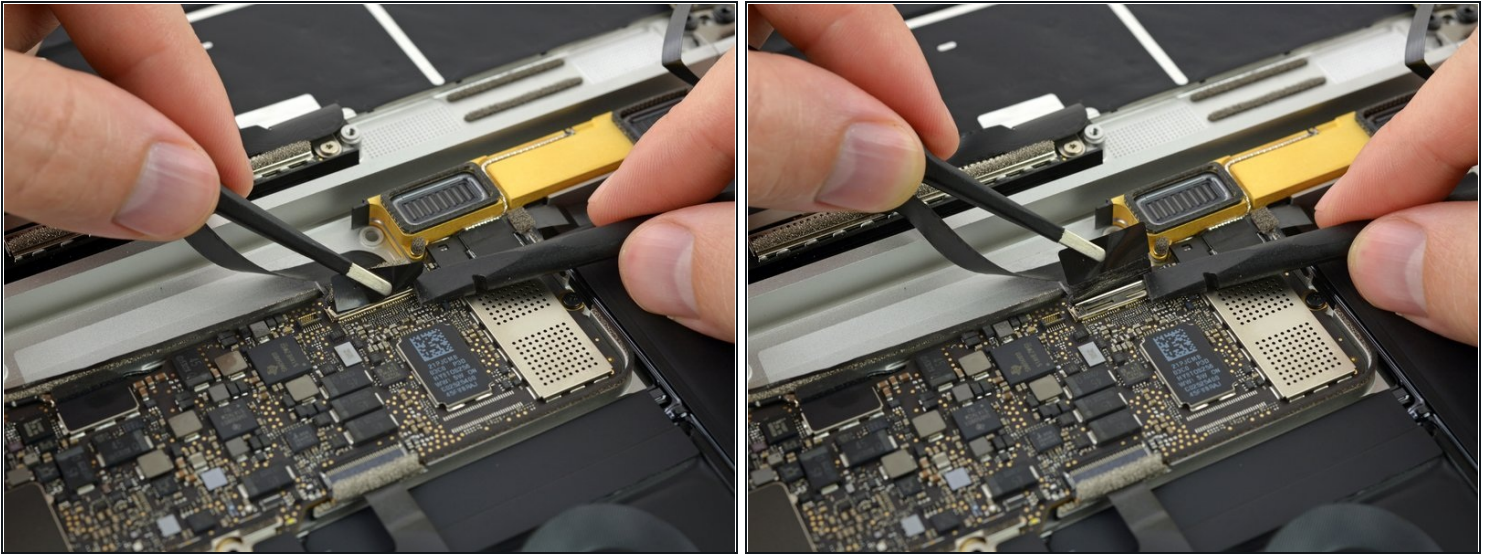
- Disconnect the audio jack board ribbon cable by pulling it straight back out of the ZIF connector.
- ☑ During reassembly, orient the ribbon cable so the white stripe faces you. Insert the cable until the white line disappears under the socket.
- ⓘ At this point it is possible to open the macbook all the way and to lay it flat on a table without causing any damage to the flex cables.

Step 19 — Lower Case Assembly Removal



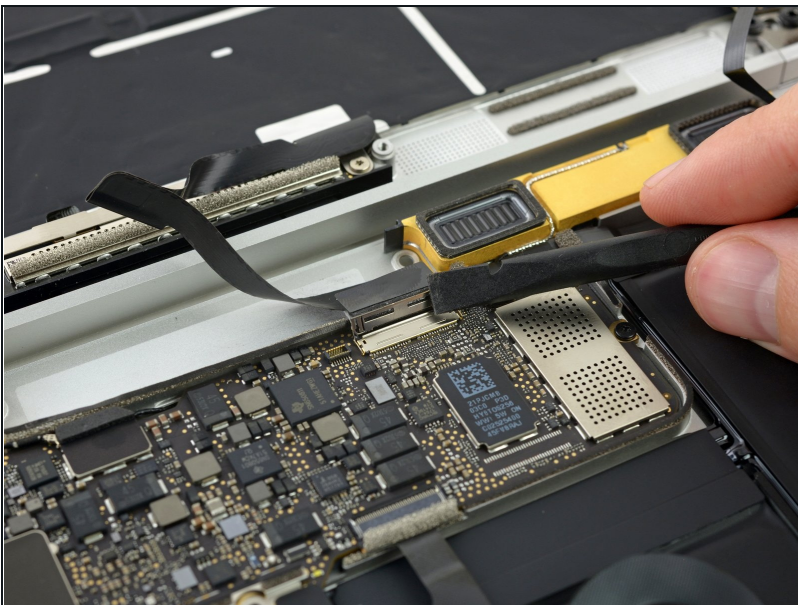
- Use tweezers to peel back the tape covering the display cable connector.

Step 20



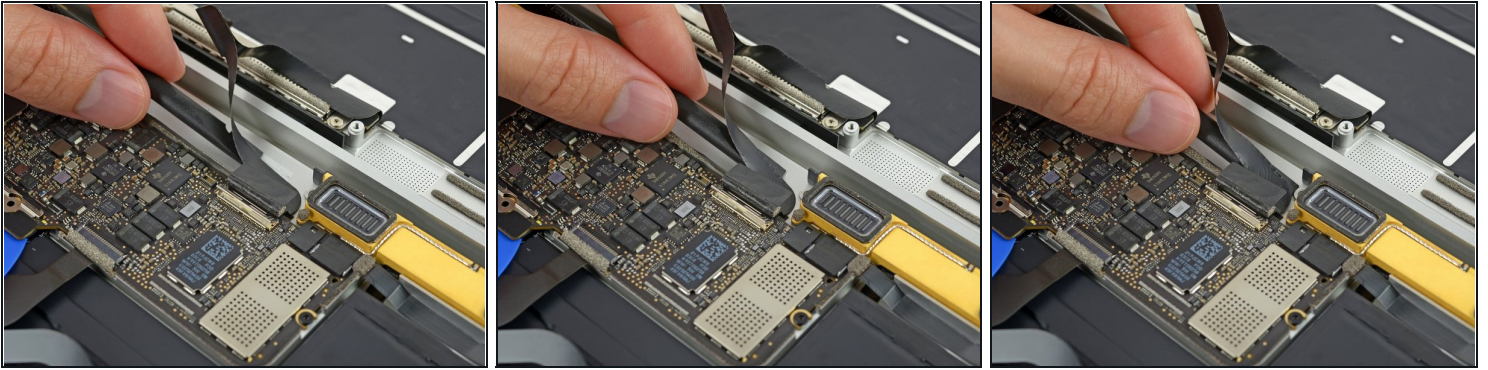
- ⓘ It's possible the metal retaining flap on the display cable connector may flip open, remaining stuck to the tape.
- If so, use the flat end of a spudger to hold down the retaining flap while peeling the tape away with the tweezers.

Step 21



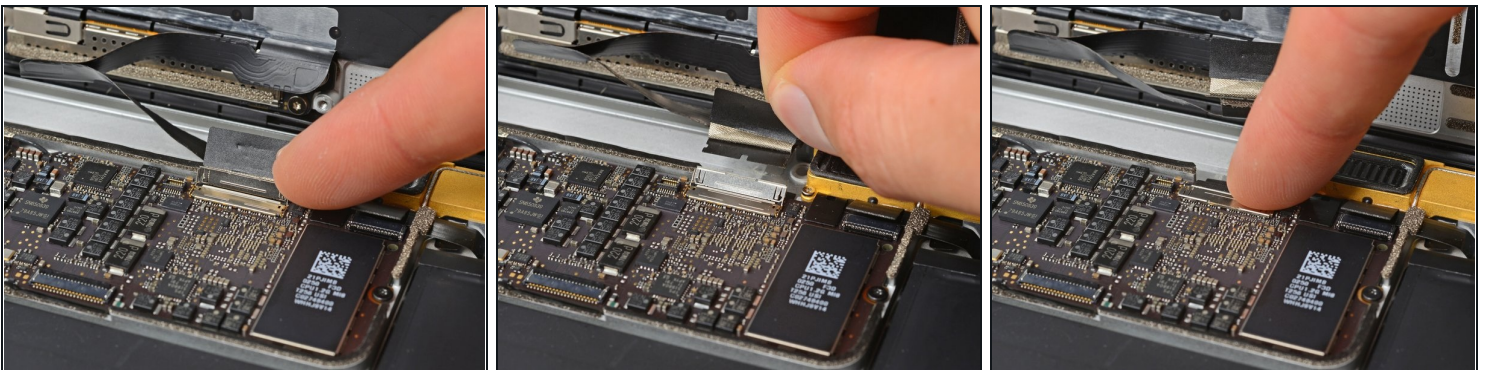
- Use the flat end of a spudger to flip open the retaining flap on the display cable connector.
- Try to keep it clear of the tape, or it may re-adhere and make cable removal difficult.

Step 22



- Carefully slide the flat end of a spudger underneath the display cable to separate the adhesive holding it to the lower case.
 - ⚠ Take care not to damage the cable. If the adhesive is very strong, heat the case directly beneath the cable with an [iOpener](#) to soften the adhesive, and then try again.

Step 23

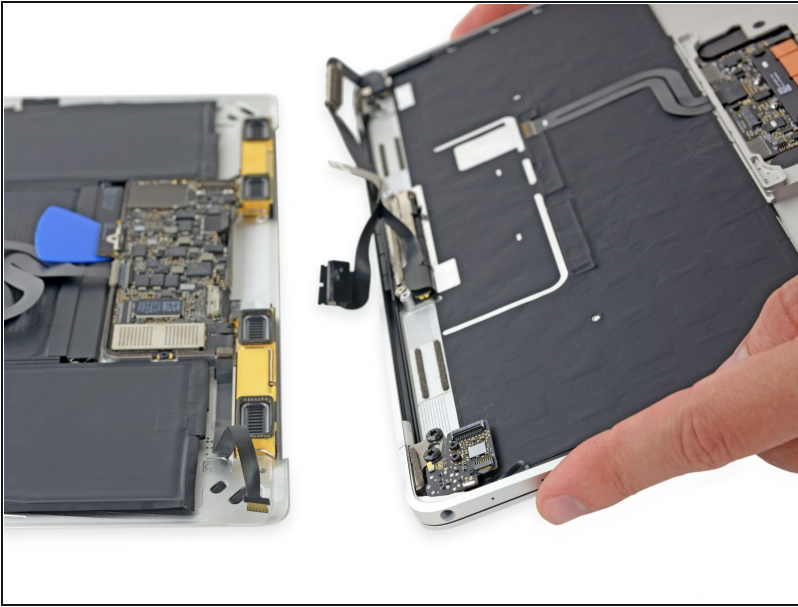


- Hold the retaining flap open.
- Disconnect the display cable by gently pulling it straight out of its connector.

⚠ Immediately close the retaining flap. Keep it closed throughout your repair.

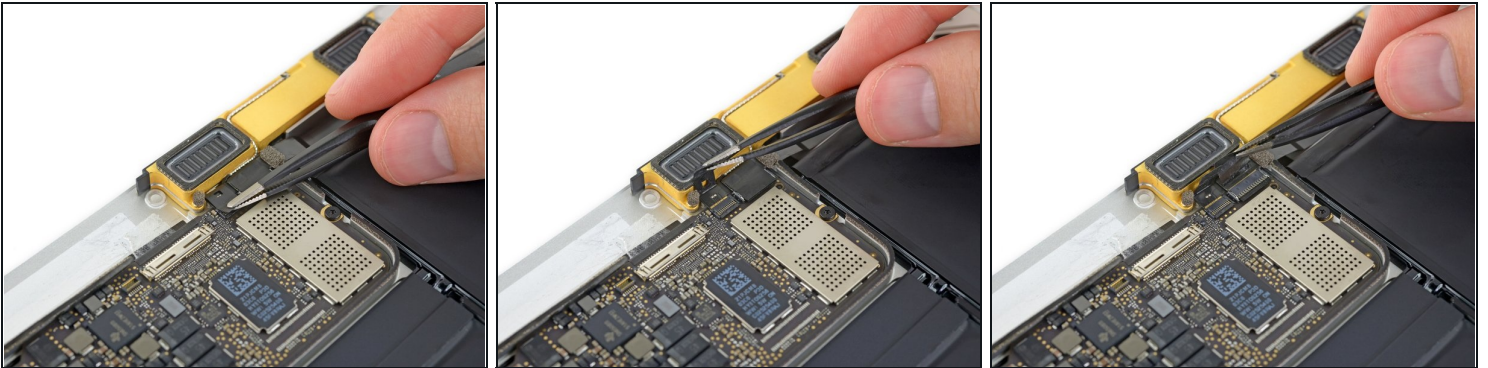
- ☑ During reassembly, **keep the flap closed** while you insert the display cable. Remember to orient the cable so its gold contacts face down, making sure not to crimp or fold it—it'll click into place when it's connected.

Step 24



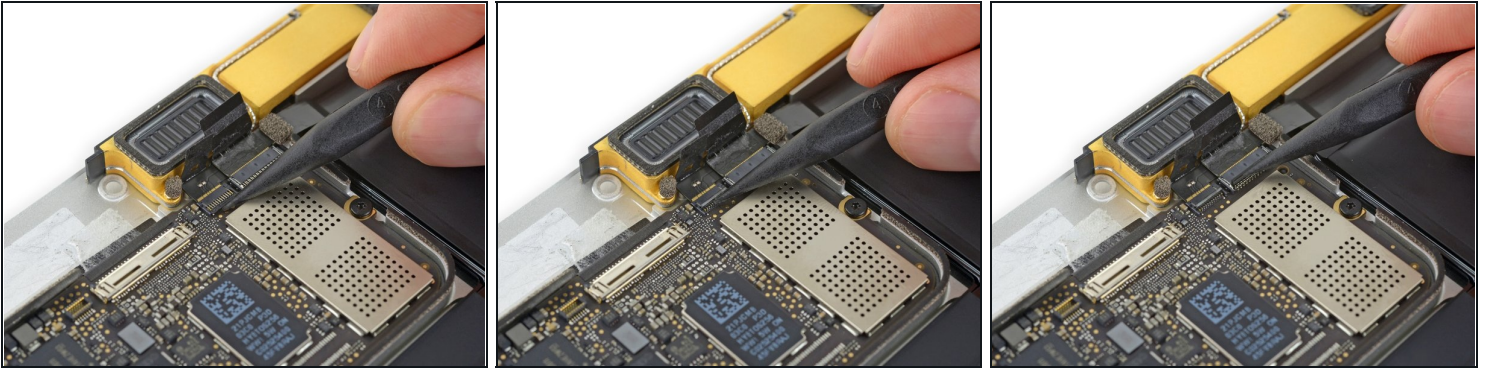
- Separate the upper case assembly from the lower case assembly.

Step 25 — Logic Board



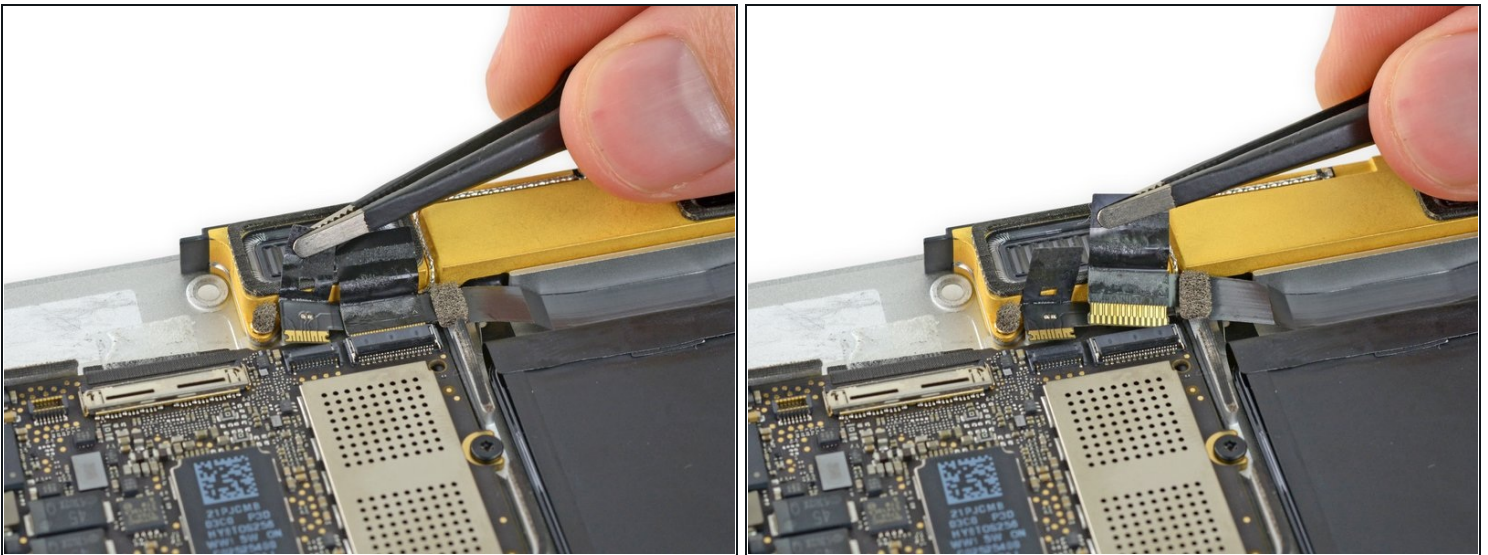
- Use tweezers to peel up the tape covering the two ZIF connectors—one for the right speaker cable, and one for the audio jack board cable.

Step 26



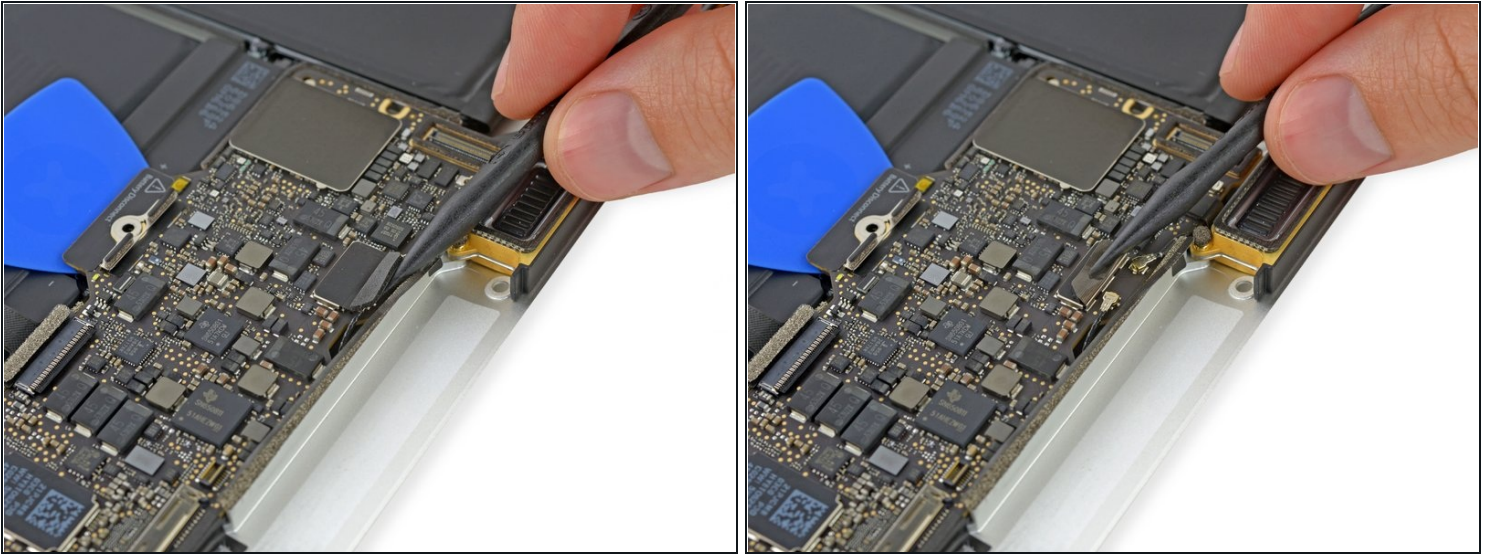
- Use the point of a spudger to flip up both ZIF connector retaining flaps.

Step 27



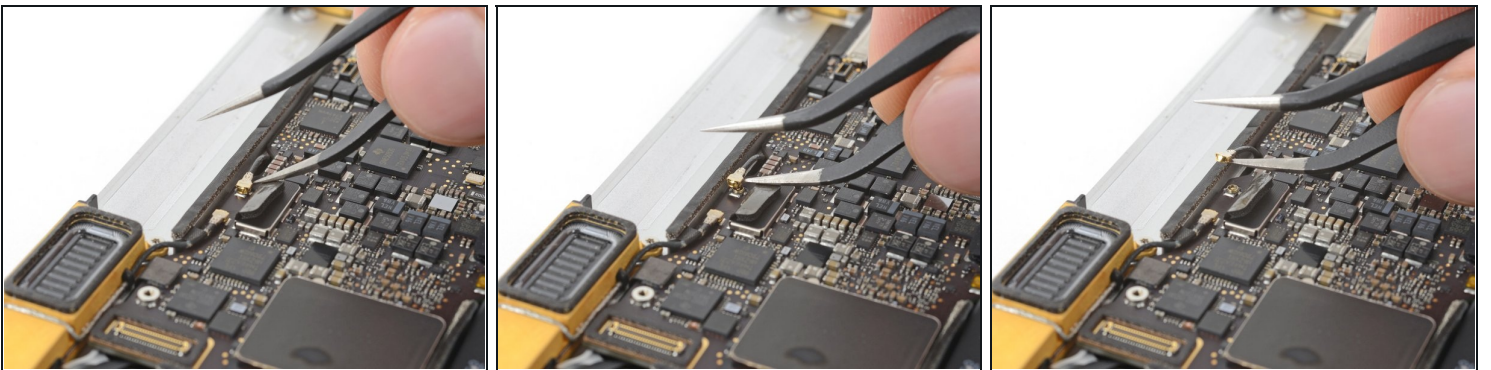
- Carefully pull straight back on the two pieces of tape you just peeled up to disconnect the two ribbon cables.

Step 28



- Use the point of a spudger to peel up the foam pad covering the two antenna connectors.

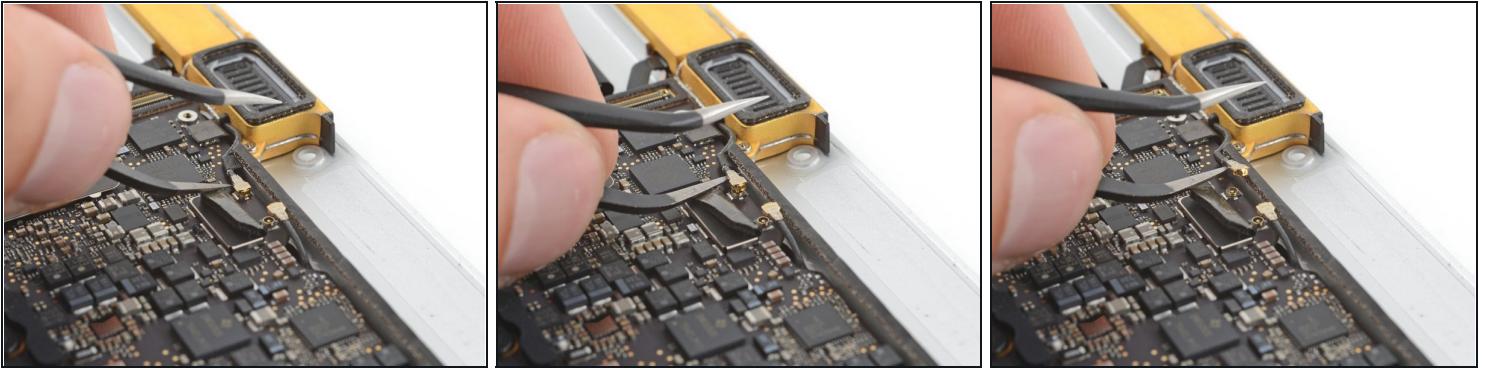
Step 29



- Insert one arm of your angled tweezers under the metal neck of the first antenna connector and pry up to disconnect it.

⚠ The antenna connectors and sockets are extremely fragile. Be very careful to lift only on the connector, and not on the socket itself. Do not lift under the cable, or put any unnecessary strain on it.

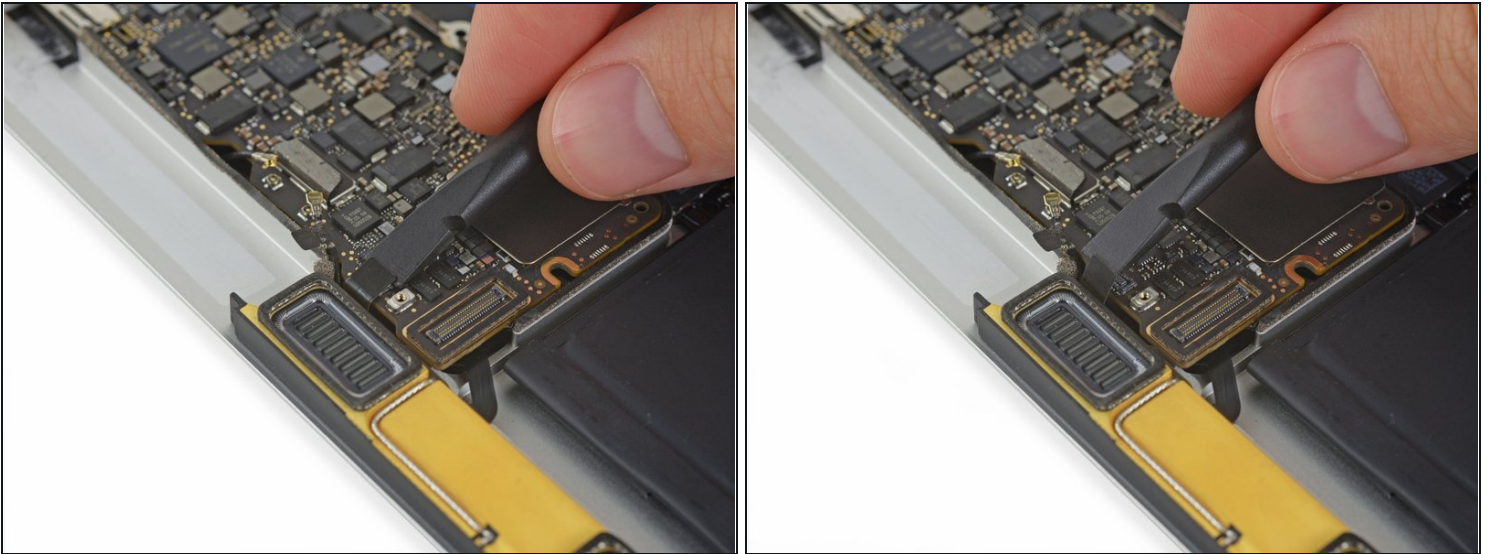
Step 30



- Pry up the second antenna connector to disconnect it.

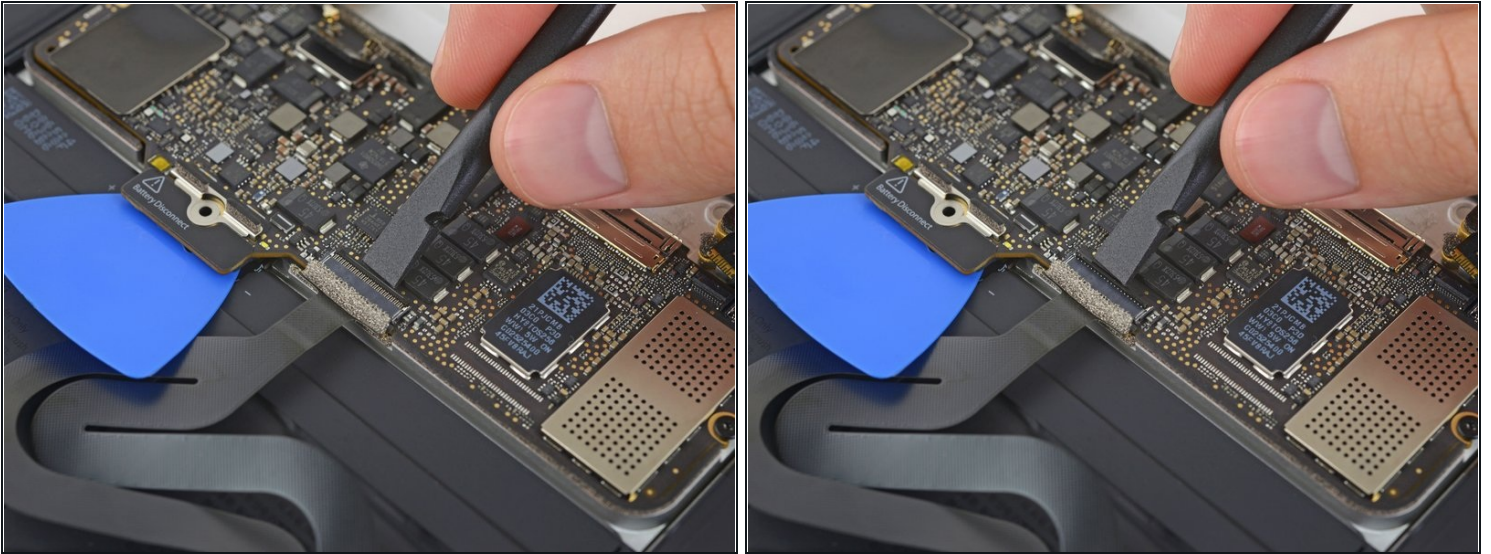
⚠ The antenna connectors and sockets are extremely fragile. Be very careful to lift only on the connector, and not on the socket itself. Do not lift under the cable, or put any unnecessary strain on it.

Step 31



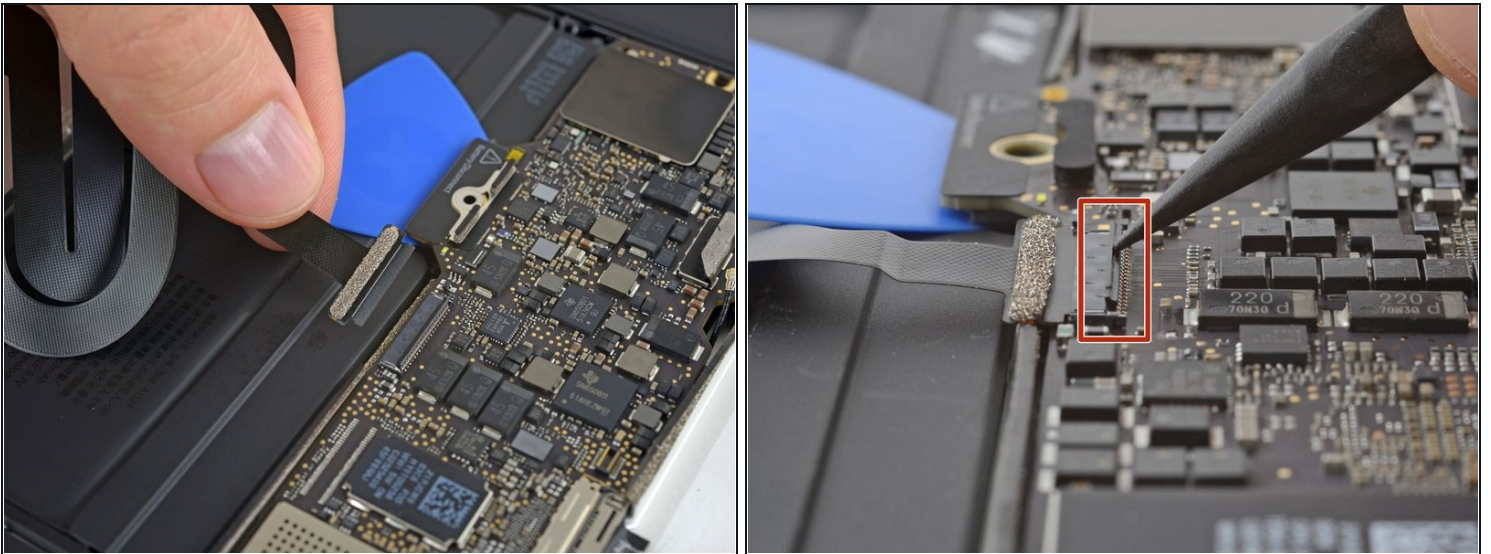
- Use a spudger to disconnect the left speaker cable connector by prying it straight up from the logic board.

Step 32



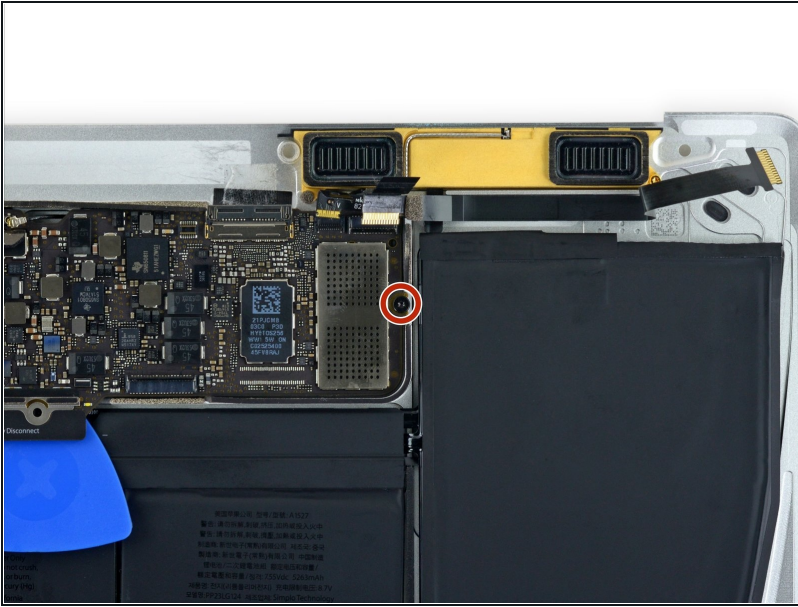
- Use a spudger to flip up the retaining flap on the trackpad cable ZIF connector.

Step 33



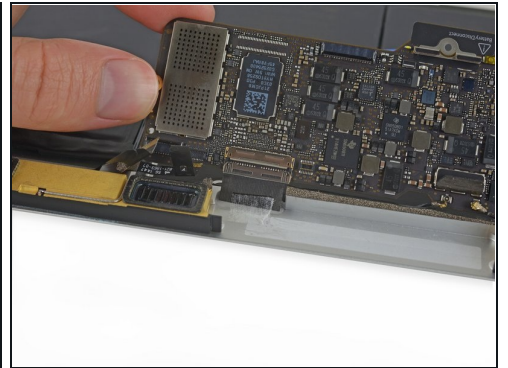
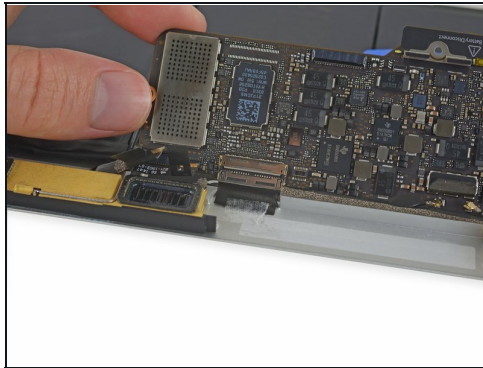
- Disconnect the trackpad cable from the logic board by gently pulling it straight out of its connector.
- ☑ During reassembly, check that your ZIF connector flaps are flipped up before reinserting their cables.

Step 34



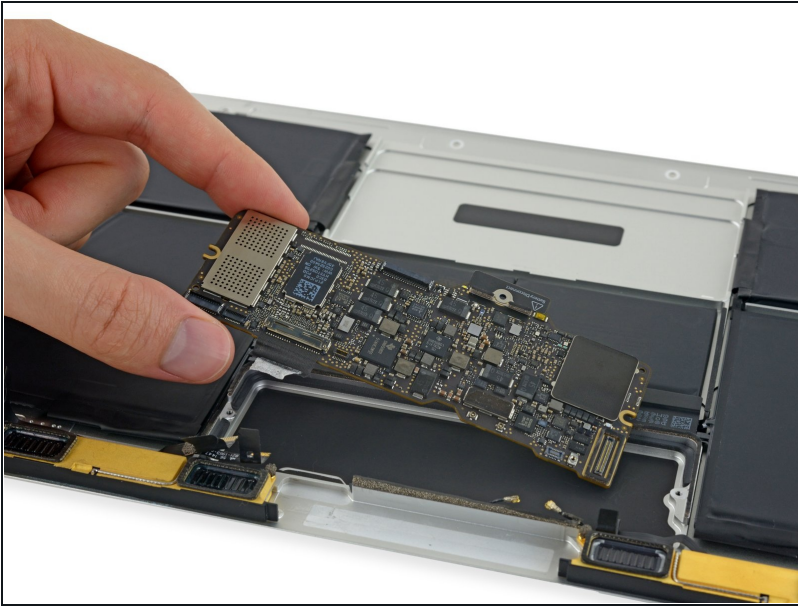
- Remove the single 3.5 mm T5 Torx screw securing the logic board to the lower case.

Step 35



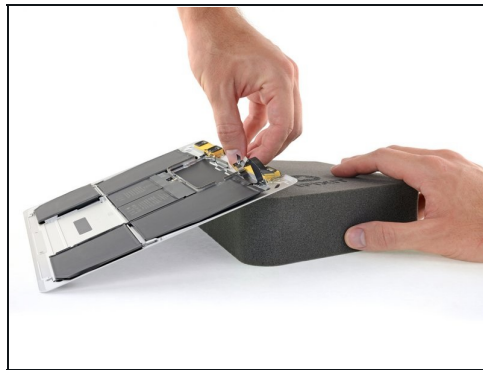
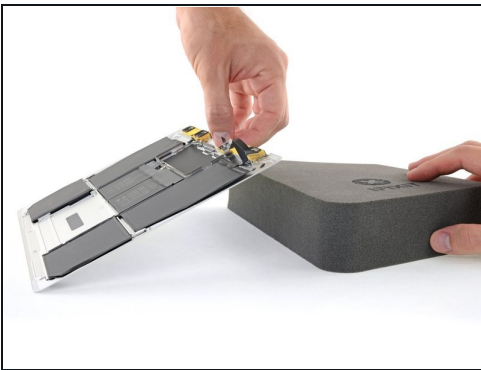
- Flip up the front edge of the logic board.
 - ⚠ Handle the logic board only by its edges.
- Lift and detach the EMI tape securing the logic board to the lower case.
 - ⓘ If the tape feels stuck, [heat it with a hair dryer](#) or iOpener to soften the adhesive.
 - 🔖 Reattach the tape securely during reassembly.

Step 36



- Remove the logic board.

Step 37 — Battery



- Lift the back edge of the lower case assembly and prop it up at an angle using a book or foam block.
 - ① In the following steps, you'll apply liquid adhesive remover along the edges of the battery cells. Keeping part of the MacBook elevated will help the adhesive remover flow underneath the battery.
 - ① You can reorient the MacBook as needed throughout this procedure, but try to prevent the adhesive remover from touching any components other than the battery and metal chassis.

⚠ If necessary, add a layer of aluminum foil underneath your MacBook to protect your workspace from wayward drops of adhesive remover.

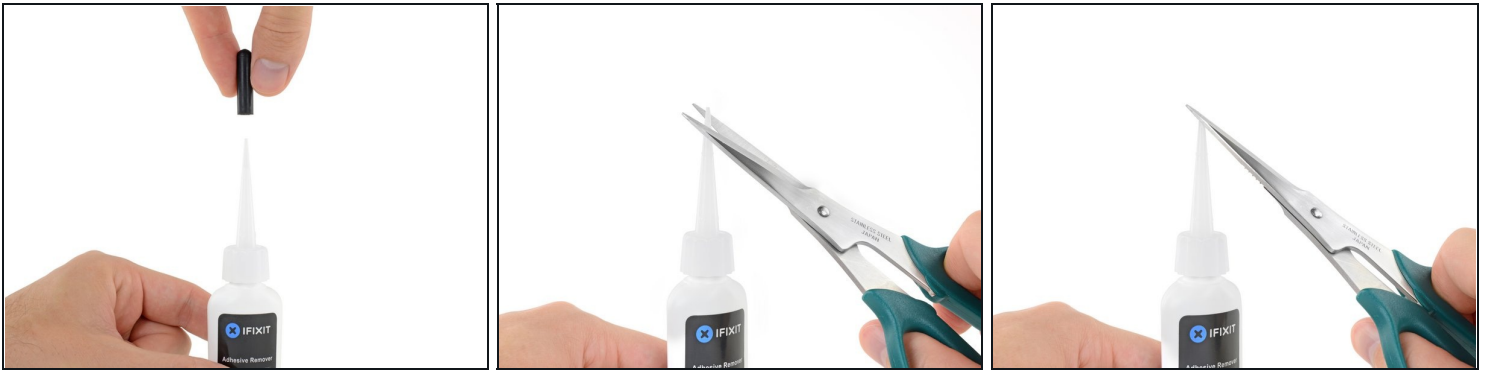
Step 38



⚠ iFixit adhesive remover contains acetone, a mild skin and eye irritant.

- Wear eye protection when handling and applying the adhesive remover. (Eye protection is included in your kit.)
- **Do not** wear contact lenses without eye protection.
- Protective gloves are also included in your kit. If you are concerned about skin irritation, put your gloves on now.

Step 39



- Pull off the black rubber stopper from your bottle of adhesive remover.

⚠ Twist to loosen or remove the bottle cap before you cut the applicator tip.

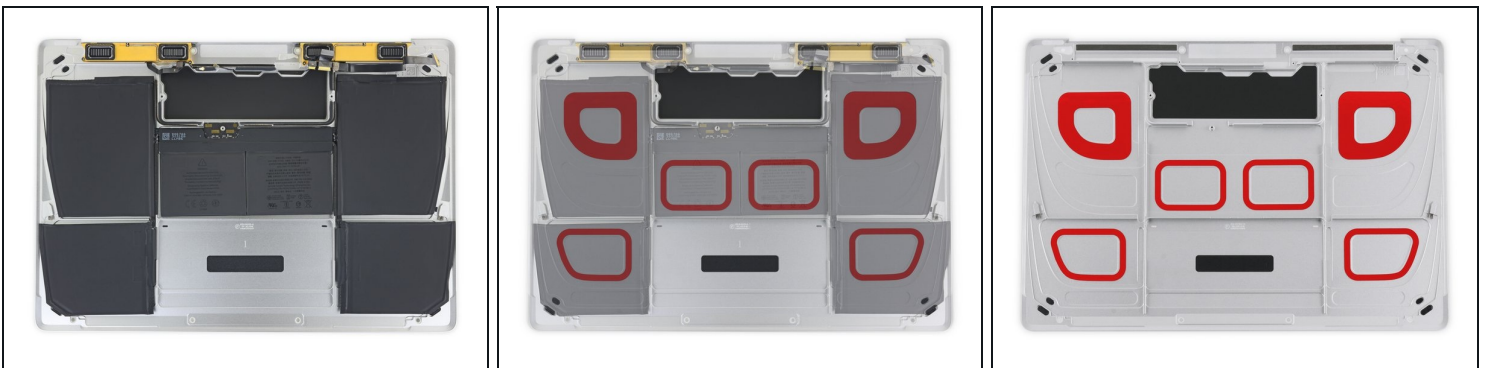
- ① This unseals the bottle and allows the pressure to equalize before you cut the applicator tip. **If you skip this step, the adhesive remover may spray out unexpectedly when the tip is cut.**

- Use scissors to cut off the sealed tip of the applicator.

- ① Cutting close to the narrow tip will give you better control so you can apply the adhesive remover in small amounts.

⚠ Twist and close the bottle cap securely before you proceed further.

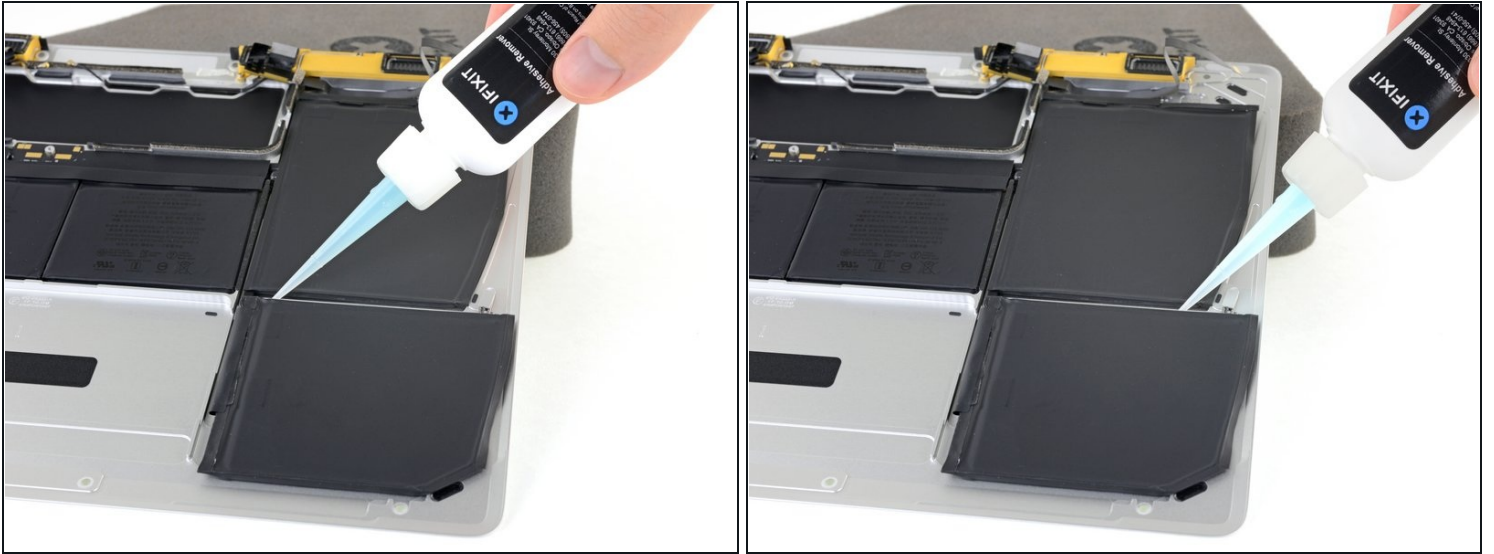
Step 40



- The adhesive securing the battery cells to the lower case is located in the areas marked in red.

- ① You may use this step for reference when applying the adhesive remover in the following steps.

Step 41



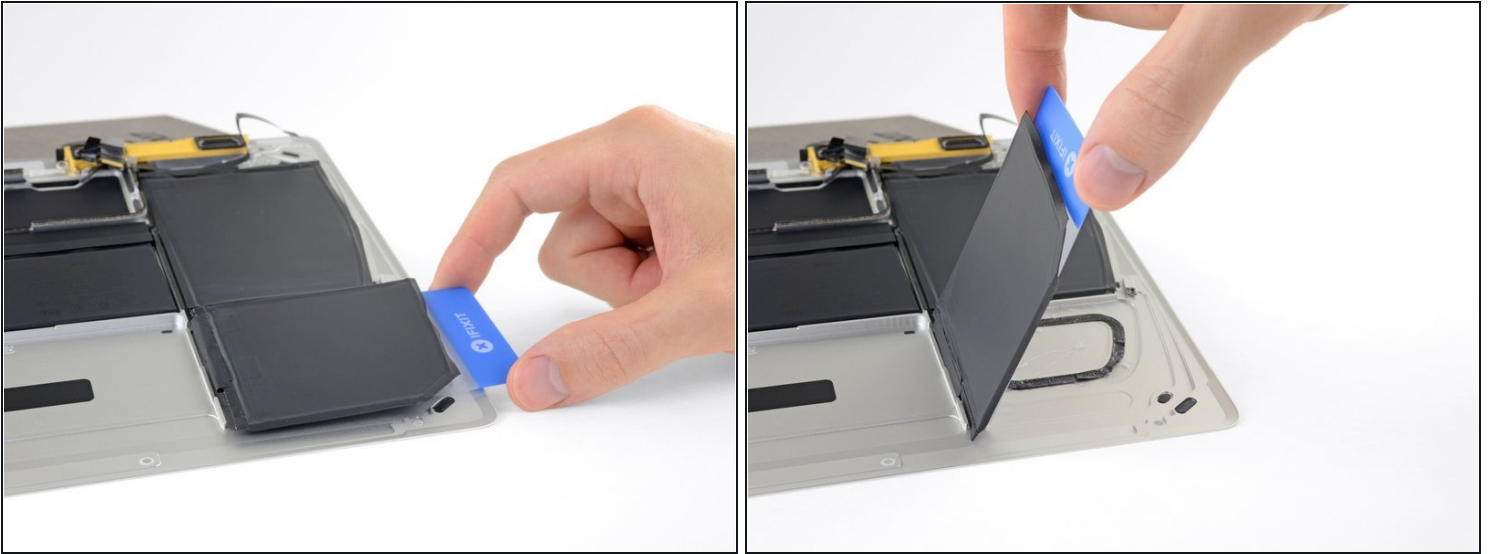
- Apply a few drops of adhesive remover along the top edge of the front right battery cell.
 - ① You don't need to use very much. The small bottle contains more than twice the amount of solvent needed to remove all six battery cells.
- Wait 2-3 minutes for the liquid adhesive remover to penetrate underneath the battery cell before you proceed to the next step.

Step 42



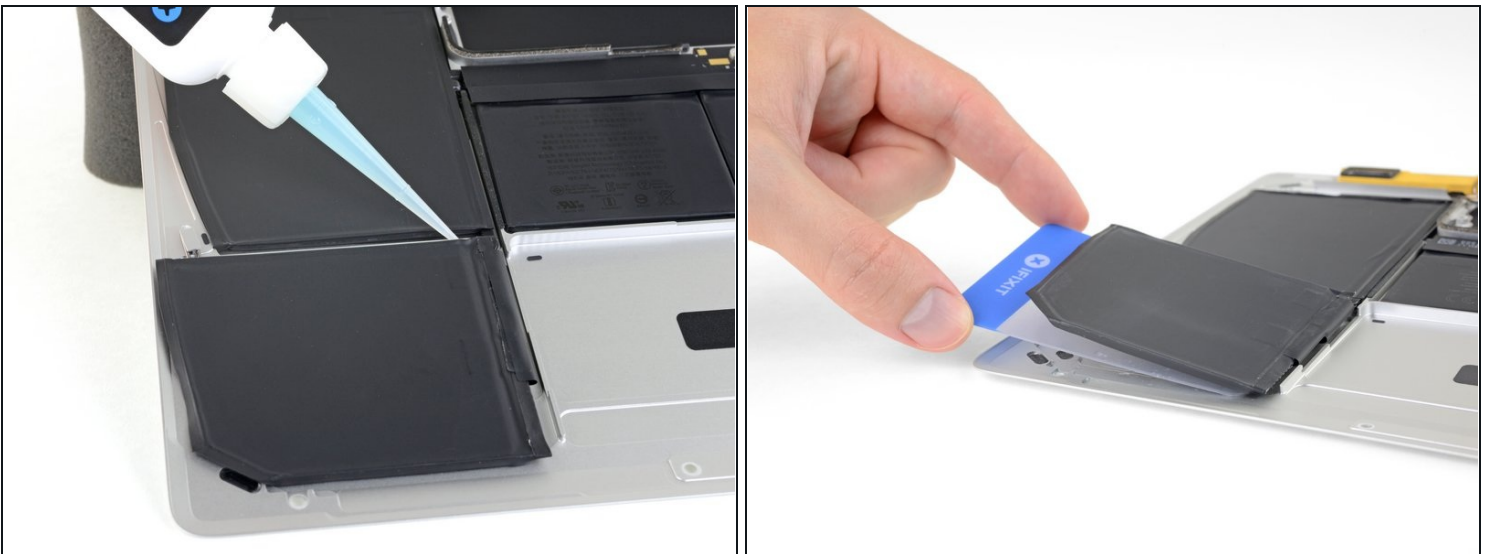
- After 2-3 minutes, slide one corner of a [plastic card](#) underneath the battery cell.
 - ⚠ This should require minimal force. If you have trouble, apply more adhesive remover along the other edges of the battery cell and give it 2-3 additional minutes to penetrate.
 - ⚠ Try not to deform the battery. A damaged or punctured battery can leak dangerous chemicals and/or catch fire.
 - ℹ It may help to gently twist the card to open up a slight gap between the battery cell and the MacBook's case.
- Slide the card farther underneath the battery cell to separate it from the adhesive securing it to the case.

Step 43



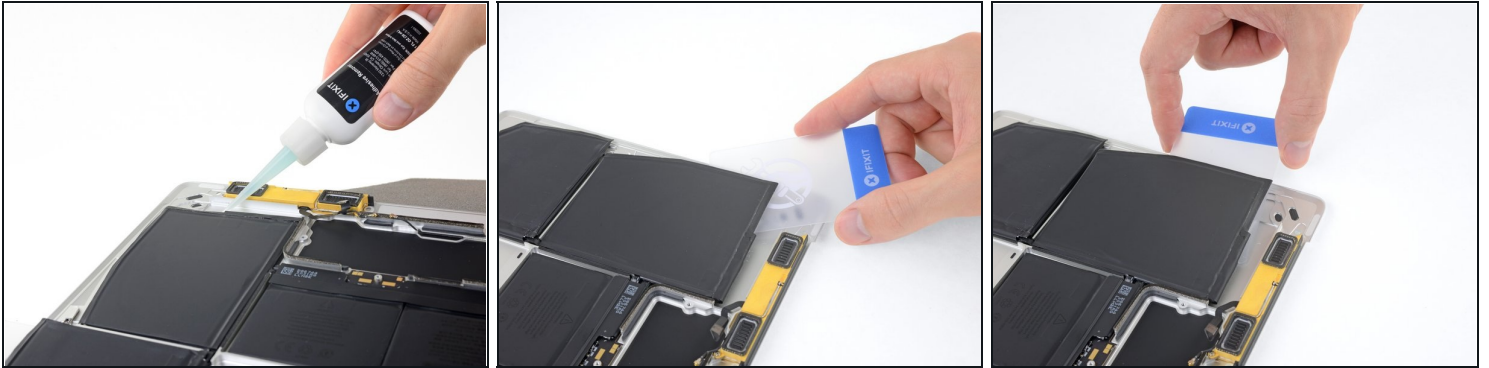
- Lift the battery cell from the right edge to fully separate it from the adhesive, but don't try to remove it.
- Leave the plastic card underneath the battery cell to prevent it from re-adhering as you proceed to the next step.

Step 44



- Repeat the previous three steps to separate the front left battery cell.
- Leave the plastic card underneath the battery cell to prevent it from re-adhering as you proceed to the next step.

Step 45



- Repeat the previous steps to separate the large battery cell on the left side of the MacBook.

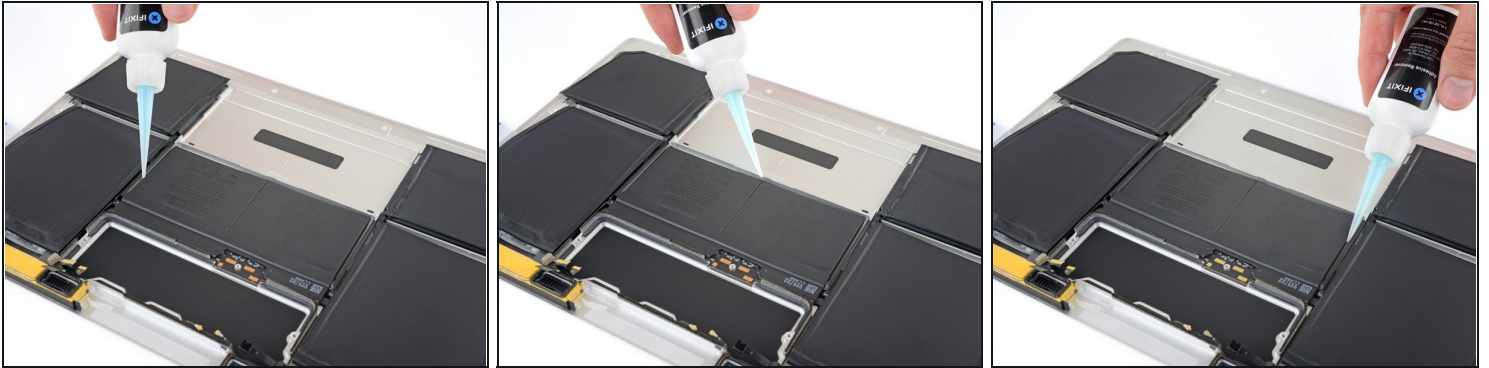
Step 46



- Repeat the previous steps to separate the large battery cell on the right side of the MacBook.

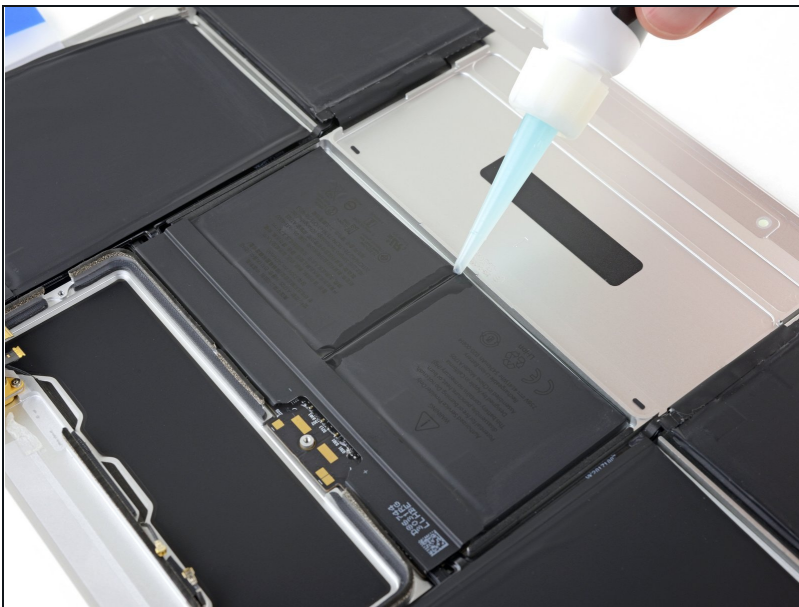
⚠ Be careful not to damage the audio jack flex cable, near the back edge of the battery cell.

Step 47



- Lay the lower case assembly down flat, and apply adhesive remover to the two middle battery cells—at each side, and along the front edge (opposite the logic board area).

Step 48



- Apply some additional adhesive remover down the middle between the two battery cells.
- Wait 2-3 minutes for the adhesive remover to penetrate before you proceed.

Step 49



- Insert your plastic card under the front edge one of the battery cells and separate it carefully.
 - ⚠ Try not to deform the battery. A damaged or punctured battery can leak dangerous chemicals and/or catch fire.
 - ℹ If you're having trouble getting the card underneath the battery cell, try working a piece of floss or wire underneath the battery cell and pull it side-to-side in a sawing motion to separate the adhesive.

Step 50



- Repeat the previous step to separate the final battery cell.

Step 51



- Remove the battery by lifting it *away* from the speaker and logic board area.
⚠ Take care not to drag the battery over the lower case assembly, or you may damage the speakers or flex cables.
- ☑ Before installing your new battery, remove all the remaining adhesive from the MacBook's case.
 - Peel off larger pieces of adhesive using tweezers or gloved fingers.
 - Scrape away any remaining adhesive with a plastic tool, and clean the underlying areas with adhesive remover or isopropyl alcohol. Wipe in one direction, not back and forth, until all the adhesive residue is gone.
- ⓘ This can take quite a bit of work, so be patient.

Step 52



- Test your new battery's fit and alignment carefully before installing it.
- ⓘ Unlike most laptop batteries, the MacBook's battery is precisely contoured to fit the "terraced" shape of the lower case. Each cell must be correctly positioned, or the MacBook may not close correctly and damage may result.
 - Your replacement battery may come affixed to a thick plastic top liner to help keep the individual cells in position as you install it. Don't remove this liner until after the battery is installed.
 - If your battery came with adhesive pre-installed on the bottom, peel away the bottom plastic liners to expose the adhesive. If your battery did not come with adhesive, apply a thin double-sided adhesive tape such as [Tesa 61395](#) to the lower case in the areas marked in red.
 - Carefully position the battery and set it into place. Press and hold each cell firmly for 5-10 seconds to secure it to the lower case. Afterward, peel off the plastic top liner along with any foam padding.

For optimal performance, [calibrate your newly installed battery](#) after completing this guide.

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

If you notice any unusual behavior or problems after installing your new battery, you may need to [reset your MacBook's SMC](#).

[Take your e-waste to an R2 or e-Stewards certified recycler.](#)

Repair didn't go as planned? Check out our [Answers community](#) for troubleshooting help.