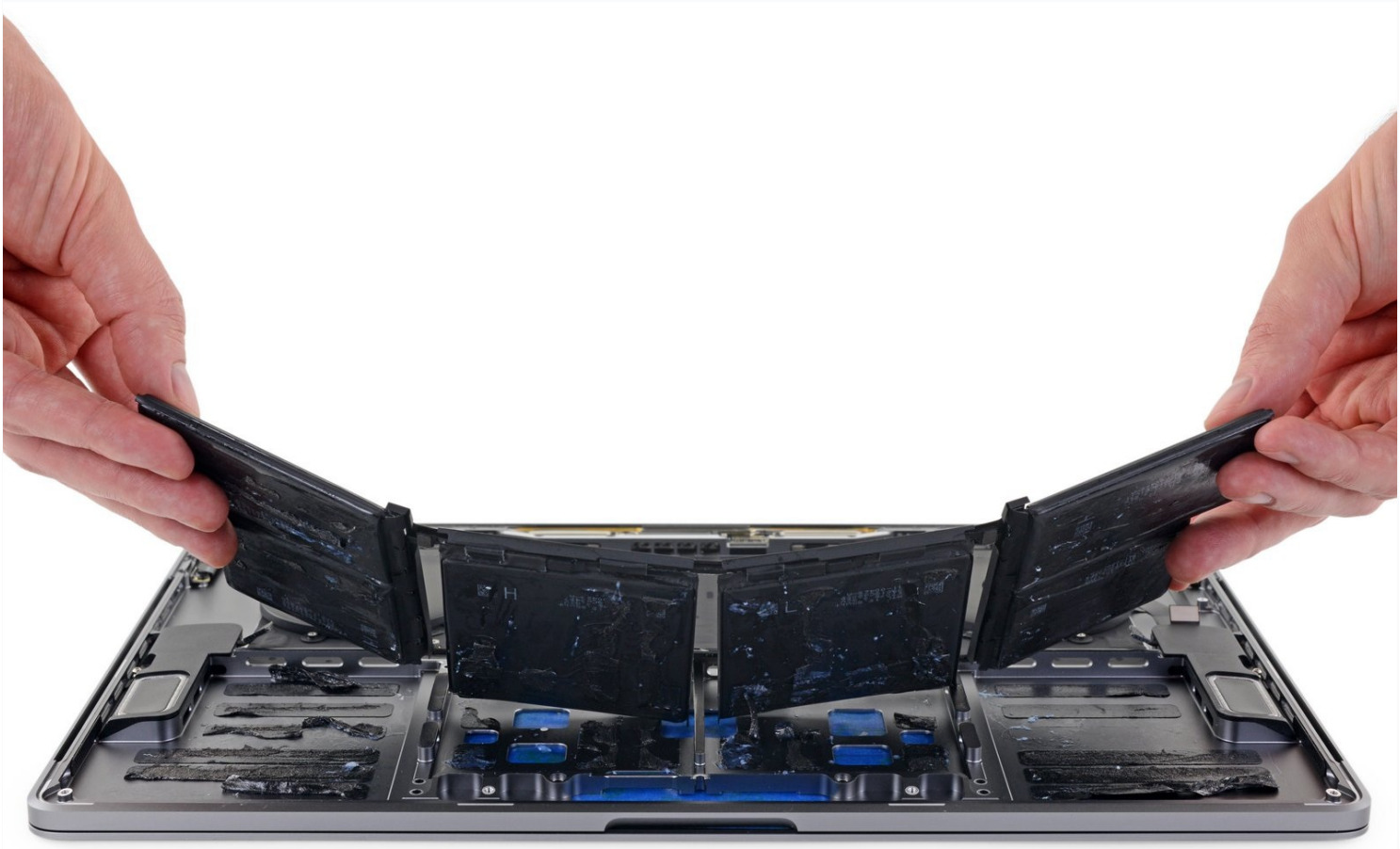
MacBook Pro 16" 2019 Battery Replacement

Use this guide to safely remove the glued-in...

Written By: Carsten Frauenheim



INTRODUCTION

Use this guide to safely remove the glued-in battery from your 16” MacBook Pro with the help of an iFixit kit with adhesive remover. The adhesive remover is designed to weaken the glue securing the battery, allowing you to remove it with ease.

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

To minimize risk of damage, turn on your MacBook and allow the battery to fully discharge before starting this procedure. A charged lithium-ion battery can create a dangerous and uncontrollable fire if accidentally punctured. If your battery looks puffy or swollen, take extra precautions.

Note: The solvent used to dissolve the battery adhesive can damage certain plastics. Follow all instructions and take care where you apply the adhesive remover.

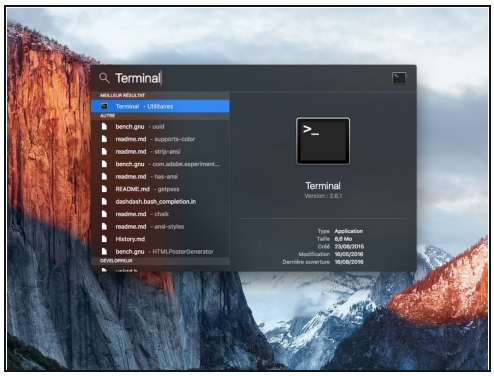
TOOLS:

- P5 Pentalobe Screwdriver Retina MacBook Pro and Air (1)
- Suction Handle (1)
- iFixit Opening Picks (Set of 6) (1)
- Spudger (1)
- Tweezers (1)
- T5 Torx Screwdriver (1)
- iOpener (1)
- T3 Torx Screwdriver (1)
- TR8 Torx Security Screwdriver (1)
- P2 Pentalobe Screwdriver iPhone (1)
- iFixit Adhesive Remover (1)
- Safety Glasses (1)
- Nitrile Gloves 100 Box (1)
- Plastic Cards (2)

PARTS:

- MacBook Pro 16" (2019) Battery (1)

Step 1 — Disable Auto Boot



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."*

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 — Remove lower case screws

⚠ Completely power off and unplug your MacBook Pro before you start. Close the display and flip the entire laptop upside-down.

- Use a P5 Pentalobe driver to remove six screws securing the lower case, of the following lengths:
  - Four 3.7 mm screws
  - Two 7.3 mm screws

📌 Note how the screws come out at a slight angle—you must reinstall them the same way.

📌 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 — Unclip lower case

- Press a suction handle into place near the front edge of the lower case, between the screw holes.
- Pull up on the suction handle just enough to open a small gap under the lower case.

Step 4

- Slide the corner of an opening pick into the gap you just created underneath the lower case.
- Slide the opening pick around the nearest corner and then halfway up the side of the MacBook Pro.

ⓘ This releases the first of the hidden clips securing the lower case. You should feel and hear the clip pop free.

Step 5



- Repeat the previous step on the other side, using an opening pick to to release the second clip.

Step 6

- Lift the front edge of the lower case (the side opposite the display hinge) enough to slide your fingertips underneath and get a good grip on it.

ⓘ Two additional hidden clips near the middle of the cover should pop free at this point, if they haven't already.

⚠ Don't lift more than an inch or so, and don't try to remove the lower case yet.

Step 7

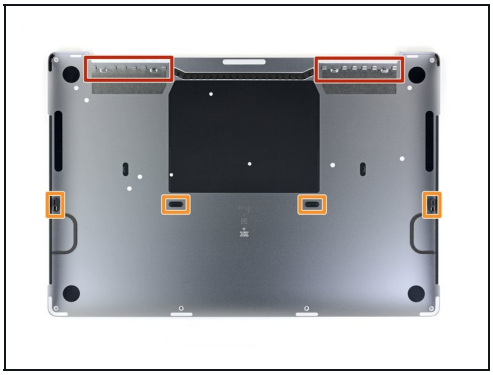
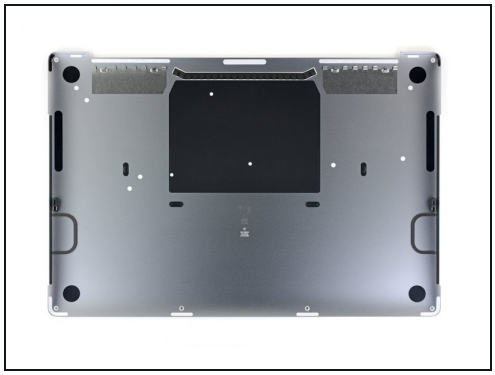


- Pull firmly to slide the lower case towards the front edge of the MacBook (away from the hinge area) to separate the last of the clips securing the lower case.
  - Pull first at one corner, then the other.

⚠ Pull to the side—not up.

ⓘ This may require a lot of force.

Step 8 — Remove lower case

- Remove the lower case.

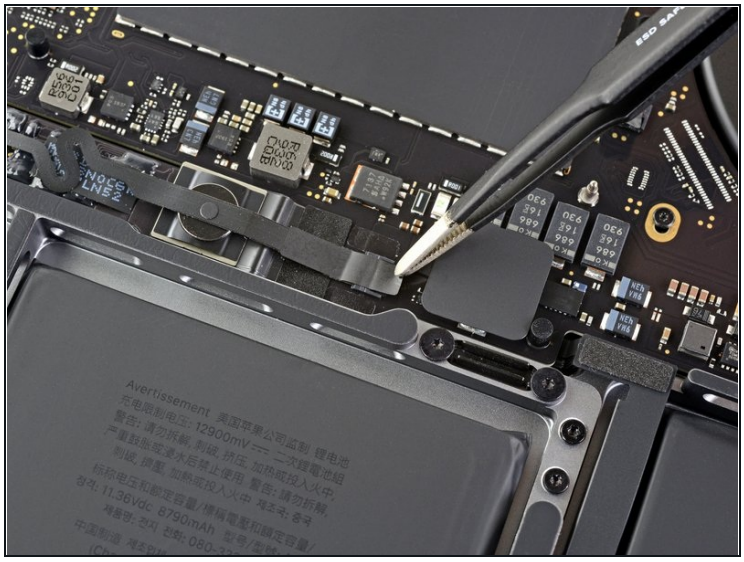
To reinstall the lower case:

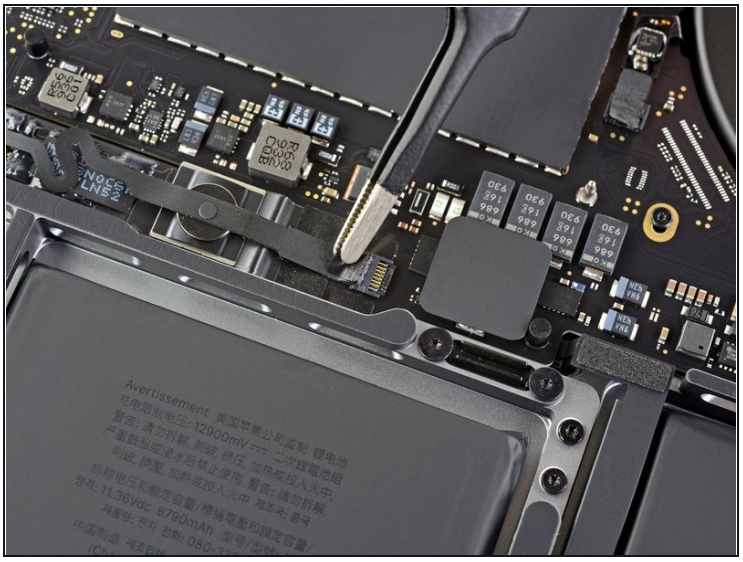
- Set it in place and align the sliding clips near the display hinge. Press down and slide the cover toward the hinge. It should stop sliding as the clips engage.
- When the sliding clips are fully engaged and the lower case looks correctly aligned, press down firmly on the lower case to engage the four hidden clips underneath. You should feel and hear them snap into place.

Step 9 — Remove battery board sticker

- Peel up and remove the insulating sticker covering the battery board, on the edge of the logic board nearest the battery.
  - If the cover doesn't peel up easily, apply mild heat with an iOpener, hair dryer, or heat gun to soften the adhesive underneath, and try again.

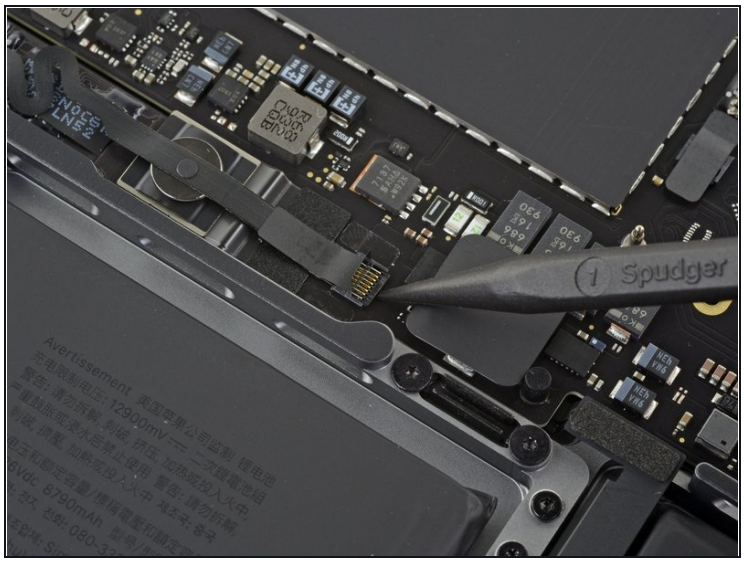
Step 10

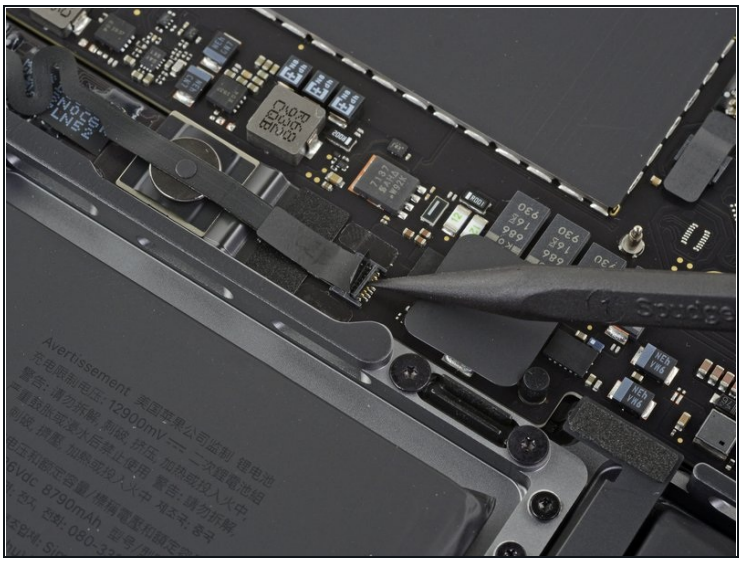




- Peel back any tape covering the battery board data cable connector.

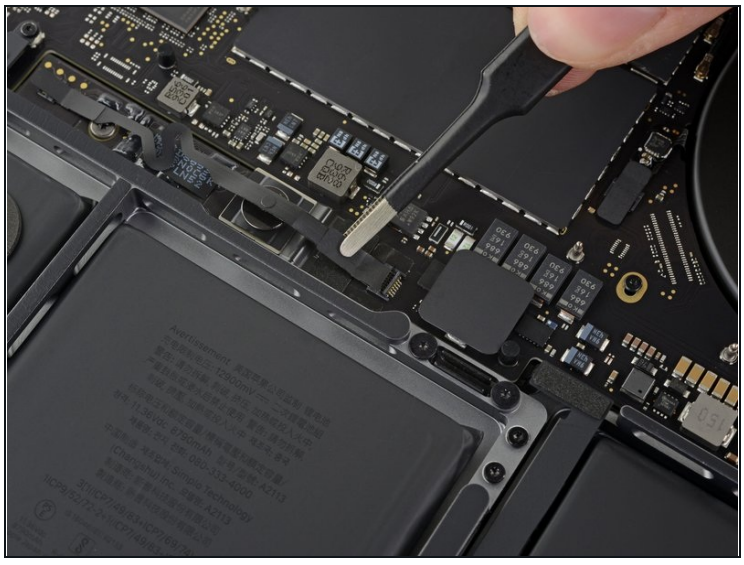
Step 11 — Disconnect battery board data cable





- Use a spudger to gently pry up the locking flap on the ZIF connector for the battery board data cable.

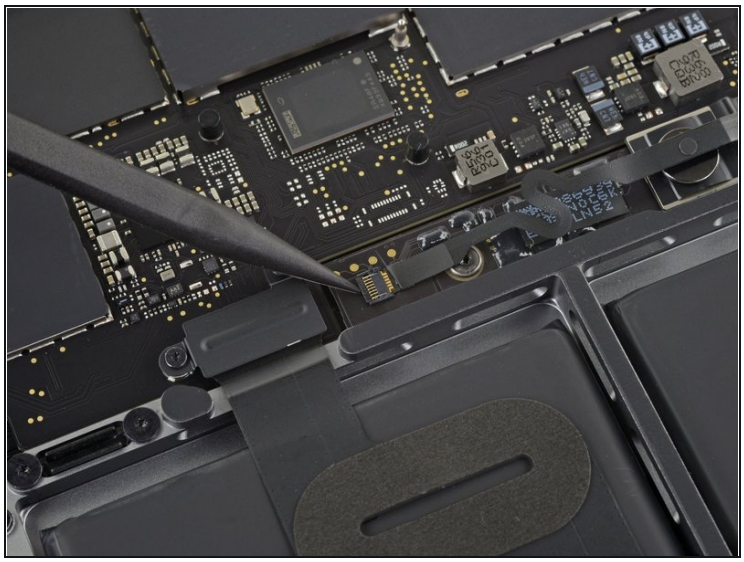
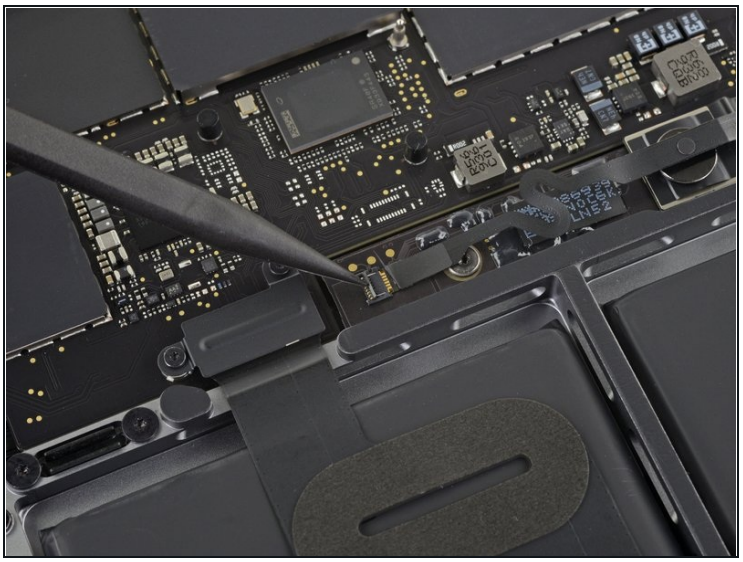
Step 12




- Disconnect the battery board data cable by sliding it out from its socket on the logic board.

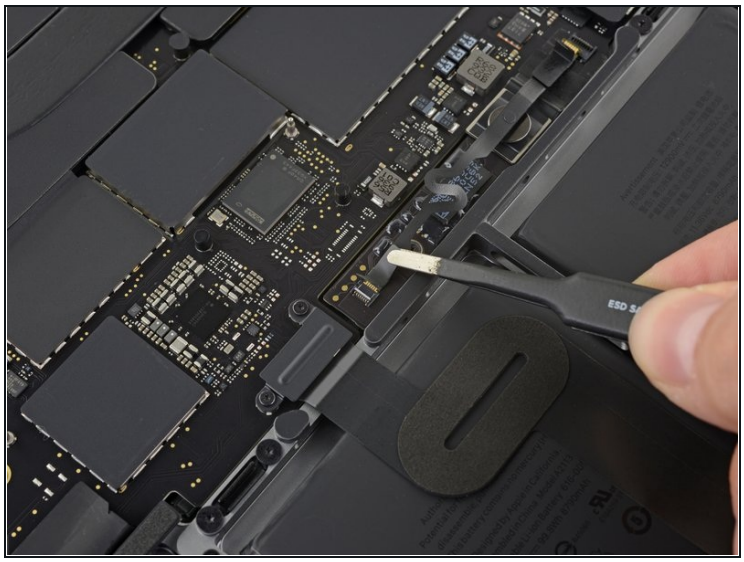
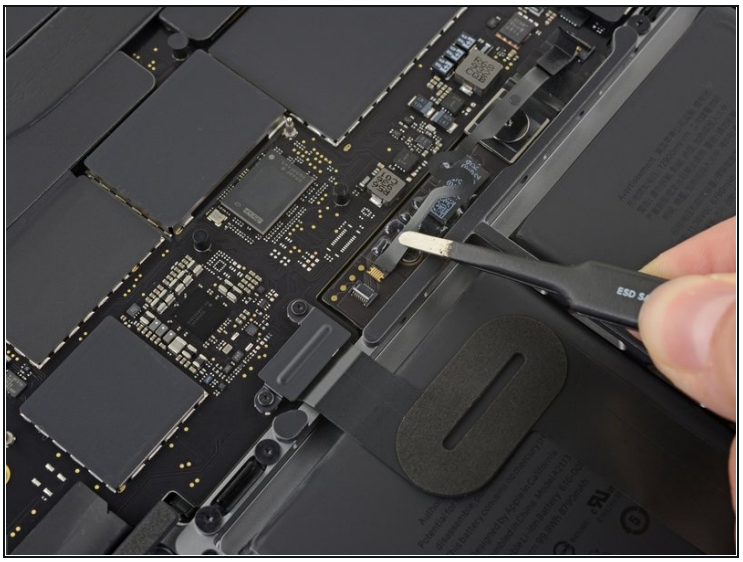
⚠ Slide parallel to the logic board. Don't pull up.

Step 13

- Peel back any tape covering the battery board data cable connector.
- Pry up and disconnect the locking flap on the connector at the opposite end of the battery board data cable.

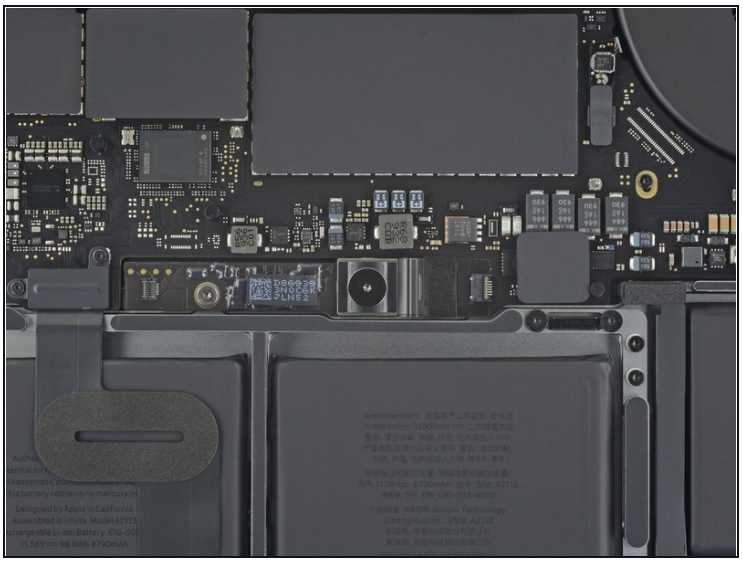
Step 14 — Remove battery board data cable

- Slide the battery board data cable out of its socket on the battery board, and remove it completely.

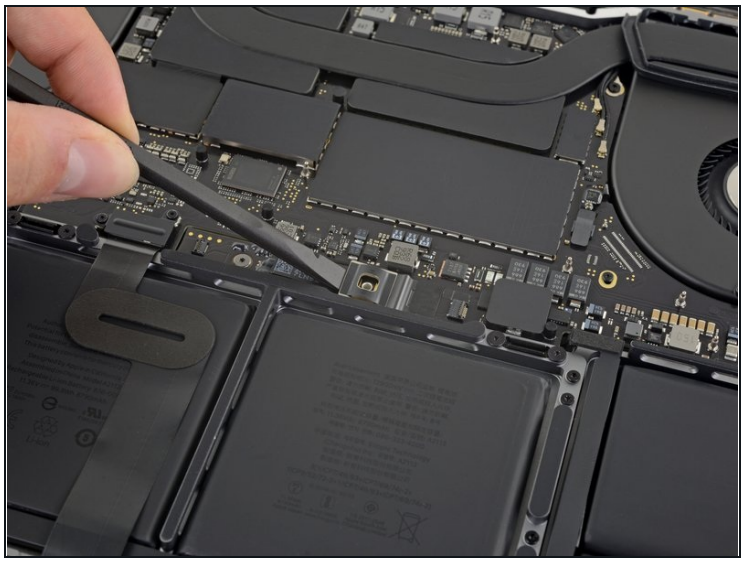
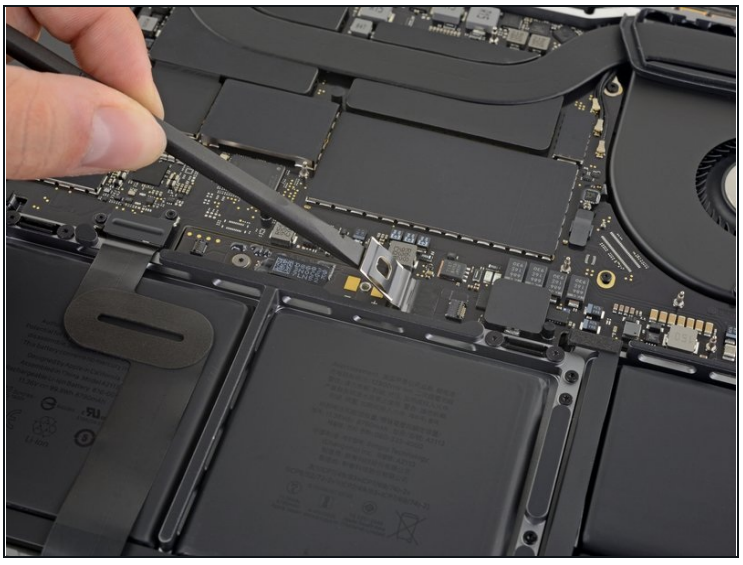
Take care not to reinstall this cable backwards or upside-down.

Step 15 — Disconnect the battery

- Use a T5 Torx driver to remove the 6.7 mm pancake screw securing the battery power connector.

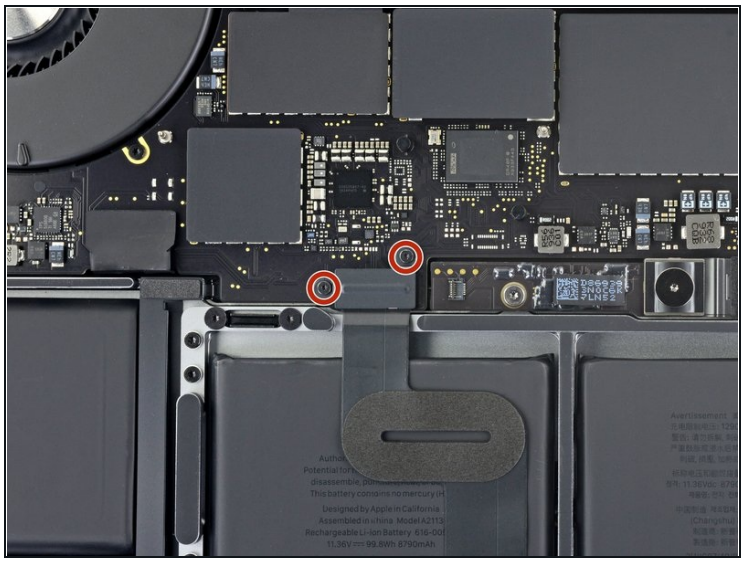
Step 16

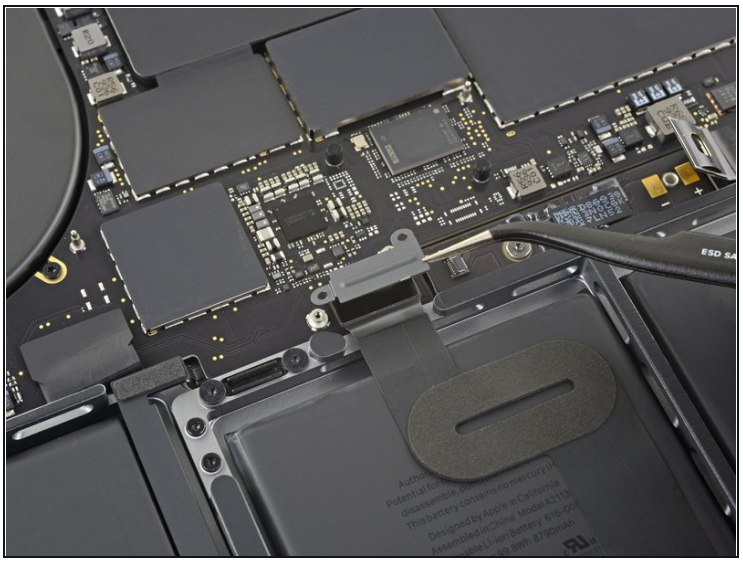



- Use a spudger to lift the battery power connector, disconnecting the battery.

⚠ Lift the connector high enough to keep it separated from its socket while you work. If it accidentally makes contact, it could damage your MacBook Pro.

Step 17 — Remove trackpad cable connector bracket





- Use a T3 Torx driver to remove the two 1.8 mm screws securing the cover bracket for the keyboard and trackpad cable connectors.
- Remove the bracket.

Step 18 — Disconnect trackpad cable

- Use a spudger to disconnect the trackpad cable by prying its connector straight up from the logic board.

Step 19

- Apply mild heat to the trackpad ribbon cable to soften the adhesive securing it to the battery.

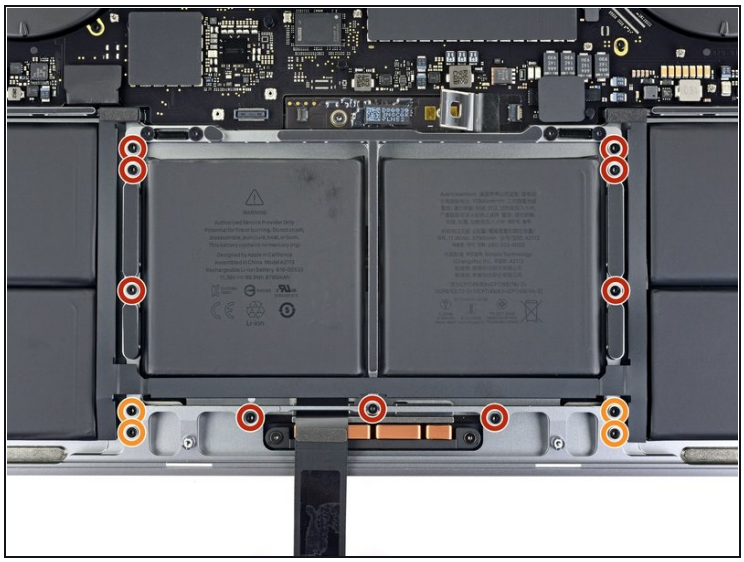
⚠ You can use an iOpener, hair dryer, or heat gun, but be careful not to overheat the battery. The cable should be warm, but not too hot to touch.

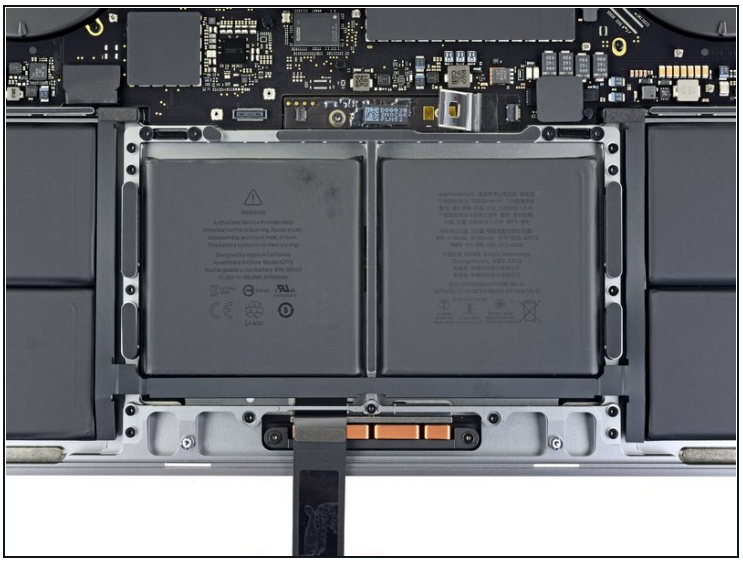
Step 20

- Carefully peel the trackpad cable up off the battery, and push it out of the way.

⚠ Don't crease or tear the cable. If you have trouble, don't force it—apply more heat and try again.

Step 21 — Remove the trackpad assembly screws





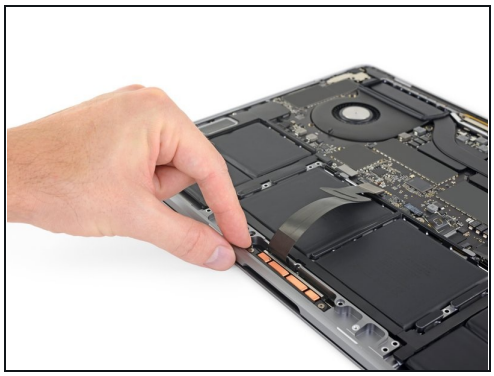
- Use a T5 Torx driver to remove the 13 screws securing the trackpad assembly:
  - Nine 5.8 mm screws
  - Four 4.9 mm screws

These screws all look similar—be careful not to mix them up.

Adding a little blue threadlocker to the screw threads during reassembly can help prevent the screws from working themselves loose over time.

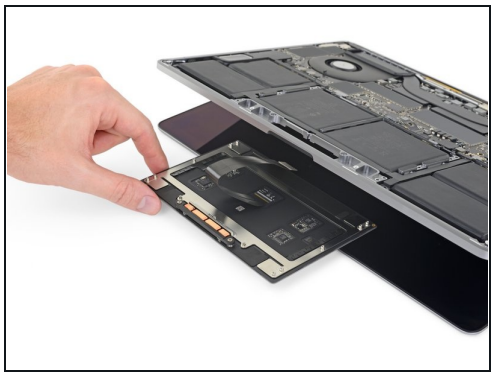
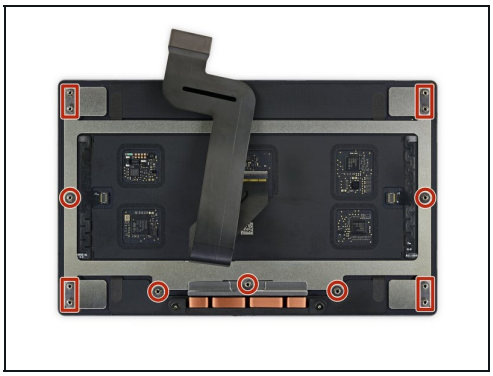
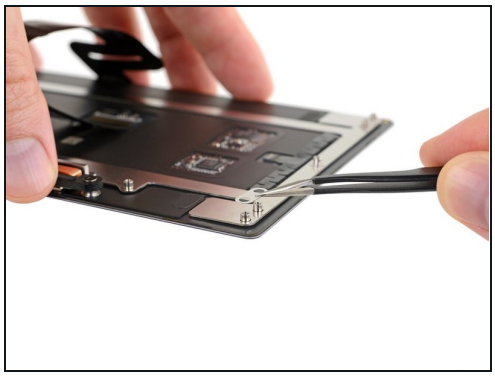
Install the screws loosely at first, and then check the trackpad alignment before tightening them down.

Step 22 — Remove the trackpad



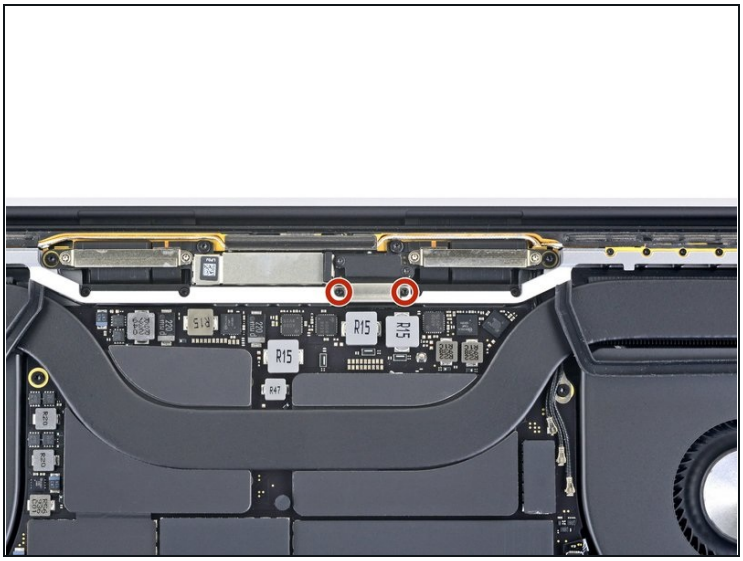
- Swing the display open slightly, but keep the MacBook upside-down. The trackpad assembly should separate and lay flat on the display.
- Carefully feed the trackpad's ribbon cable through its slot in the chassis.

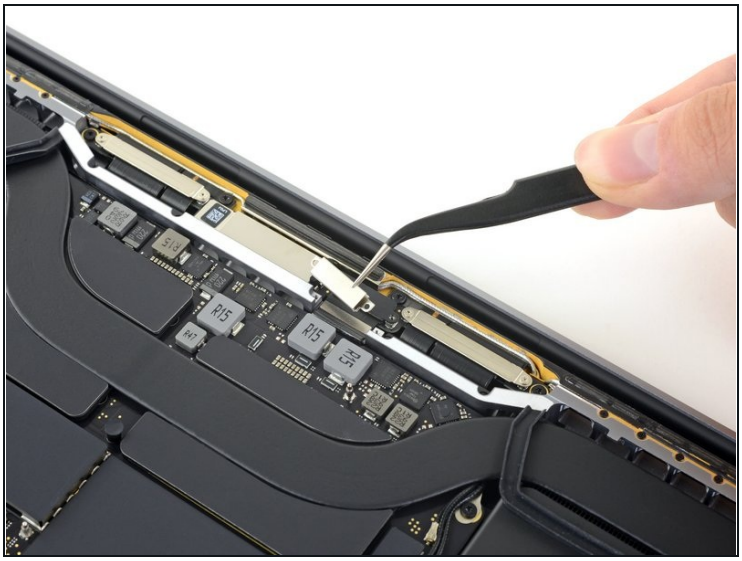
Step 23

- As you remove the trackpad assembly, be very careful not to lose the nine small metal washers resting on the screw posts. (They will fly off and get lost with very little provocation.)
- Remove the trackpad assembly.

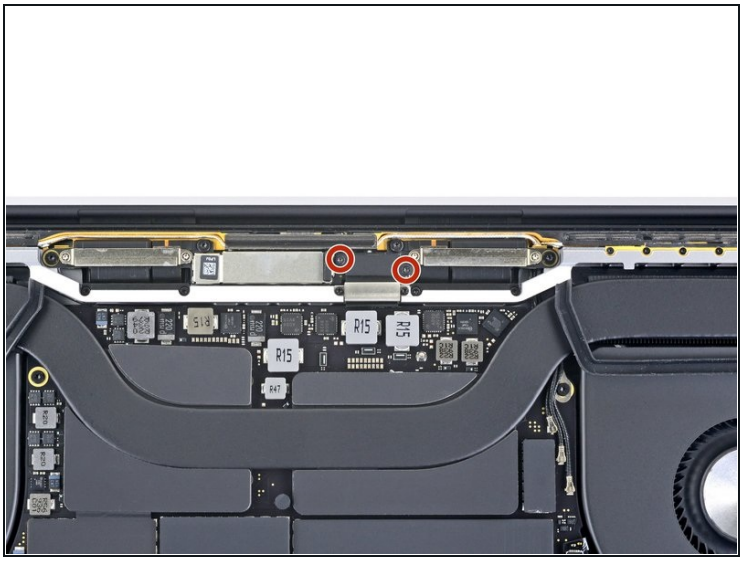
Step 24 — Disconnect the display board





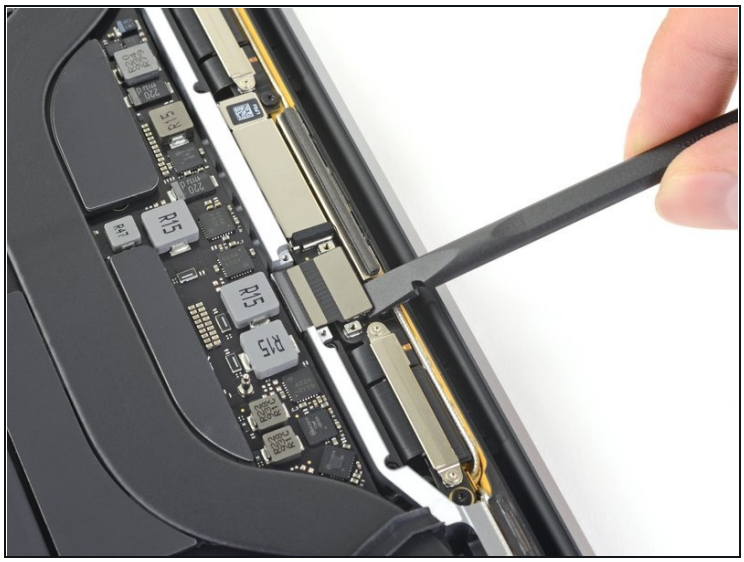
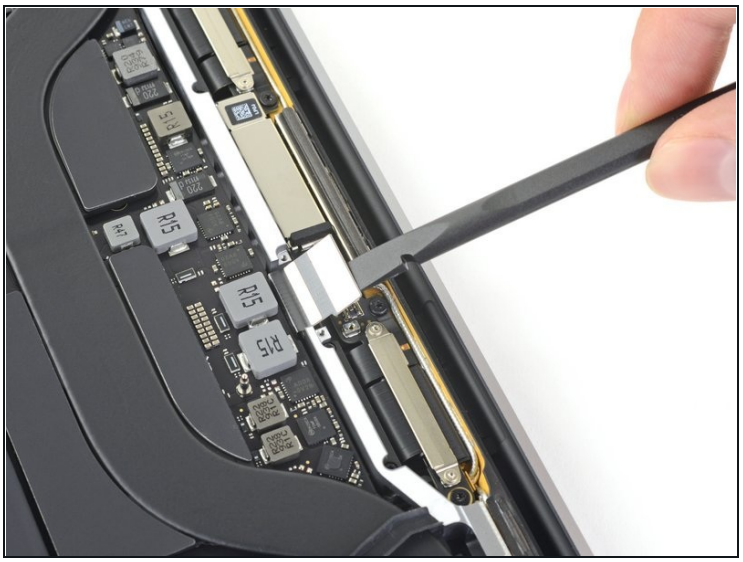
- Use a T3 Torx driver to remove the two 3.5 mm screws securing the cover on the display board flex cable.
- Remove the display board flex cover.

Step 25



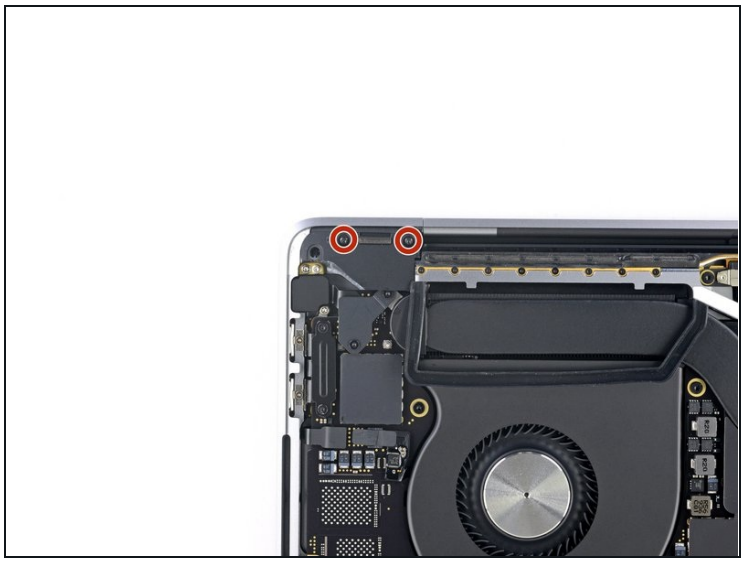
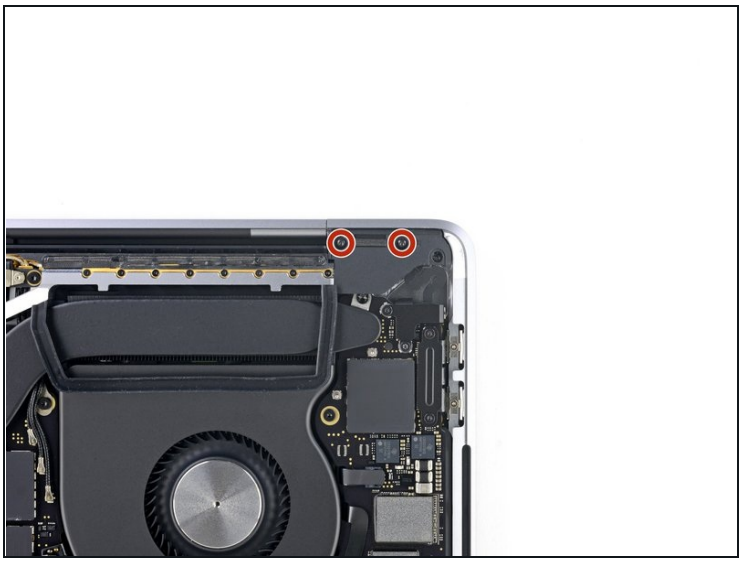
- Using a T3 Torx driver, remove the two 1.6 mm screws securing the bracket for the display board cable connector.
- Remove the display board cable connector bracket.

Step 26

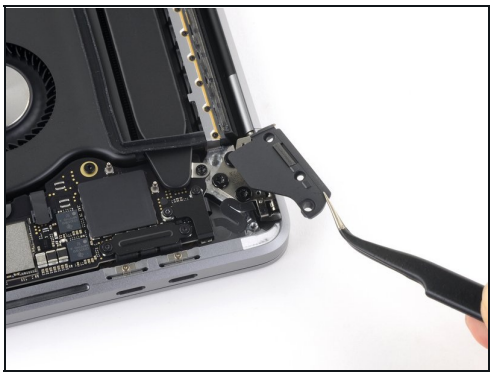
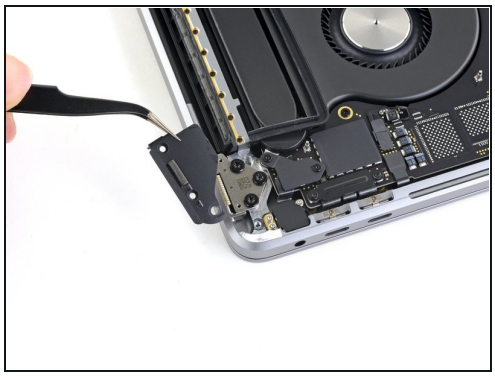
- Pry the display board flex cable straight up from its socket to disconnect it from the display board.

Step 27 — Remove the hinge covers

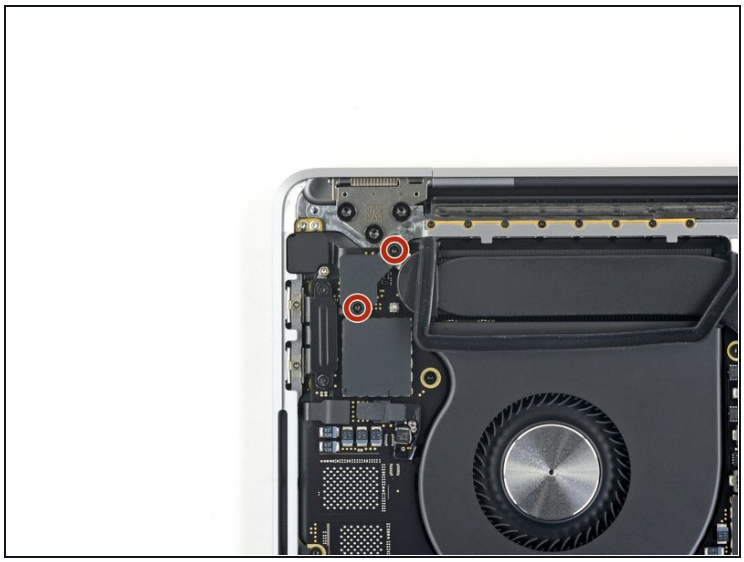
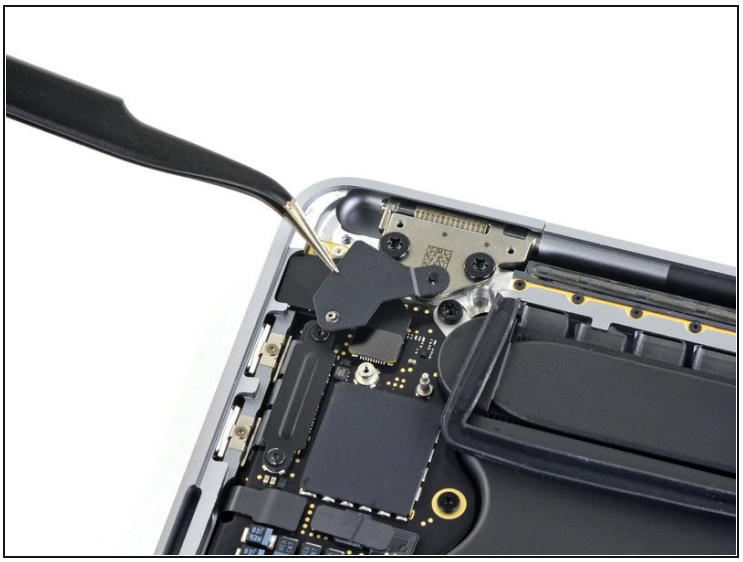
- Use a T3 Torx driver to remove the four 2.0 mm screws from the hinge covers (two screws on each side).

Step 28

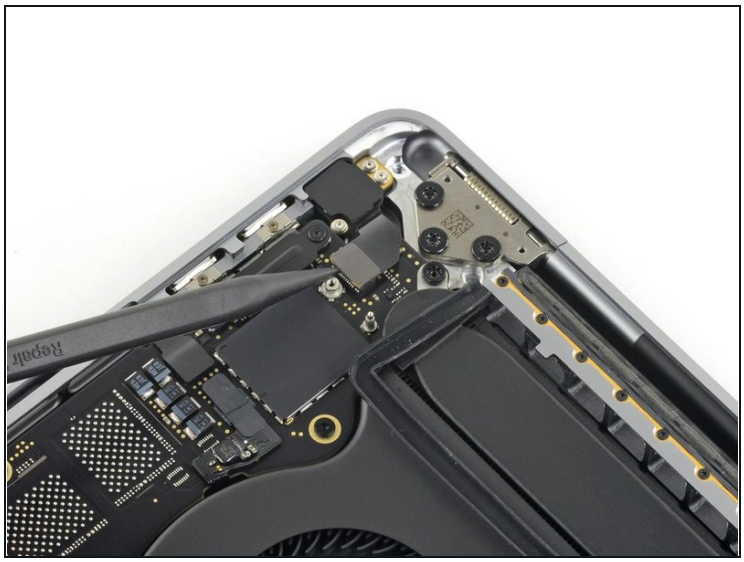
- Remove the two hinge covers.

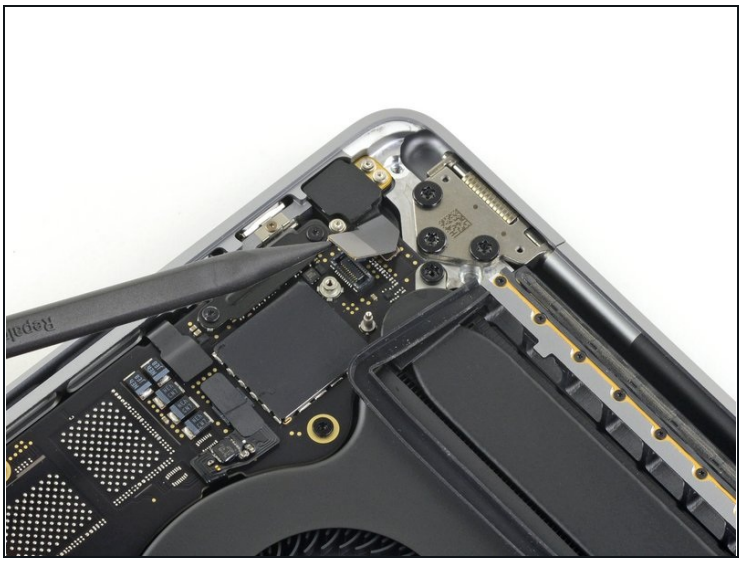
Step 29 — Disconnect Touch ID and headphone jack cable connectors

- Use a T3 Torx driver to remove the two 2.4 mm screws securing the cover bracket for the Touch ID and headphone jack cable connectors.
- Remove the bracket.

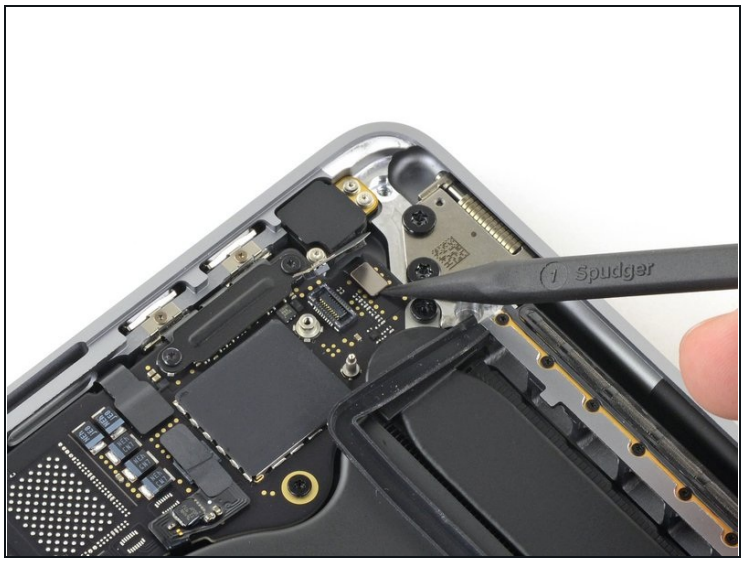
Step 30

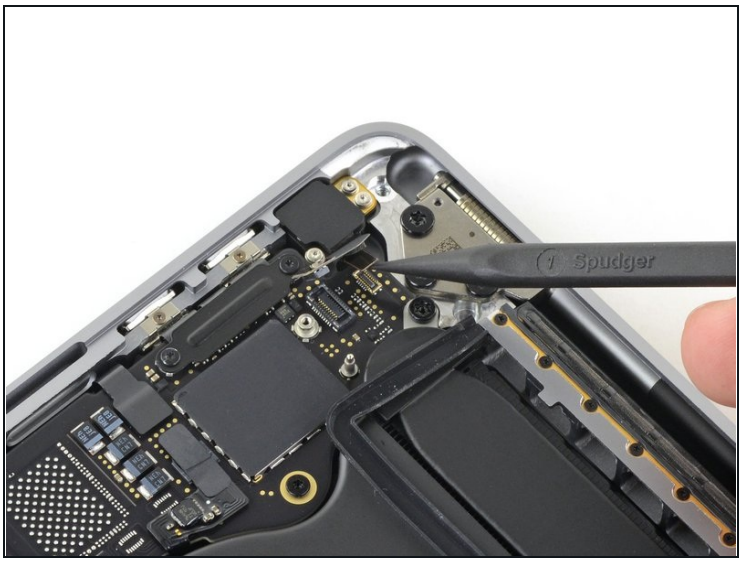




- Disconnect the headphone jack flex connector by prying it straight up from the logic board.

Step 31

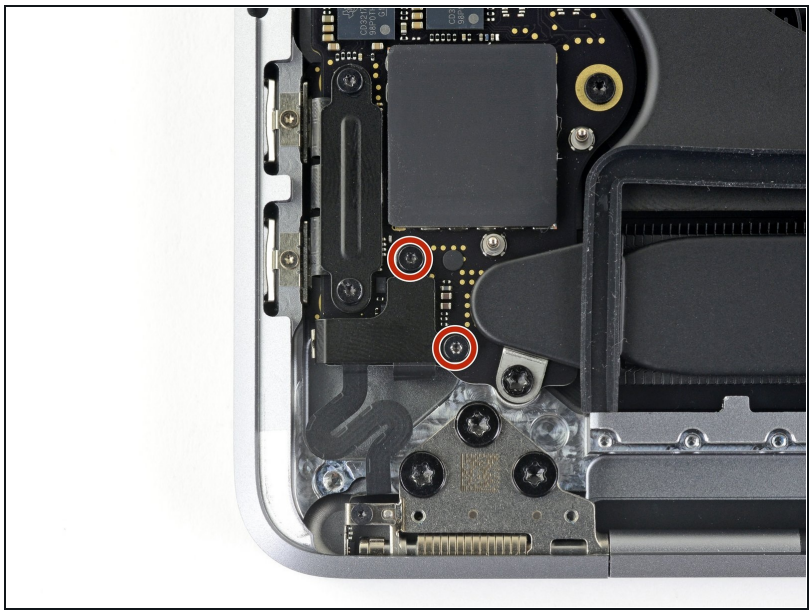




- Disconnect the power button and Touch ID sensor by prying its connector straight up from the logic board.

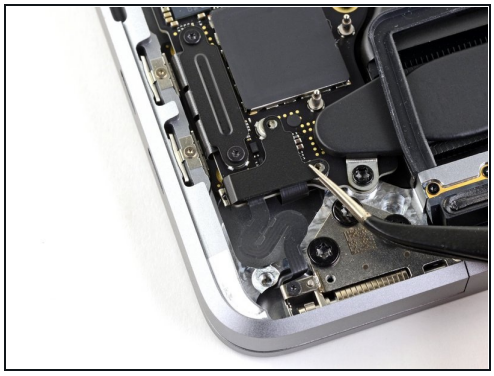
These two small connectors have a tendency to get caught underneath the logic board during reinstallation, so double check they're correctly positioned before screwing down the logic board.

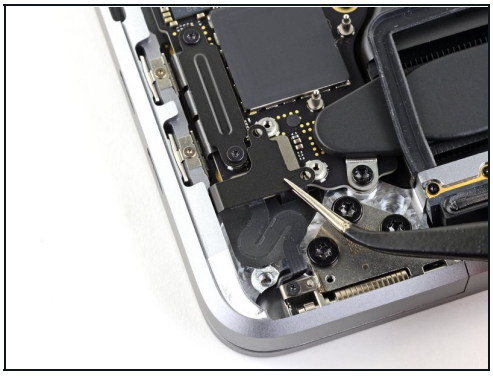
Step 32 — Disconnect Touch Bar and lid angle sensor connectors

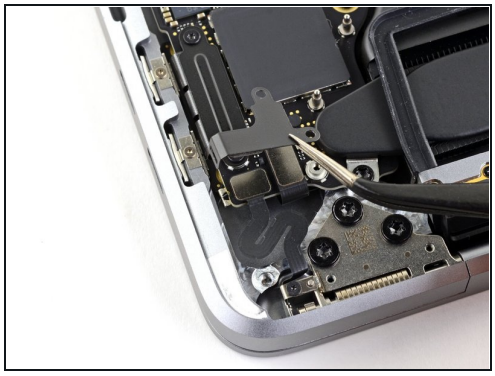


- Using a T3 Torx driver, remove the two 1.5 mm screws securing the cover bracket for the Touch Bar digitizer and lid angle sensor connectors.

Step 33

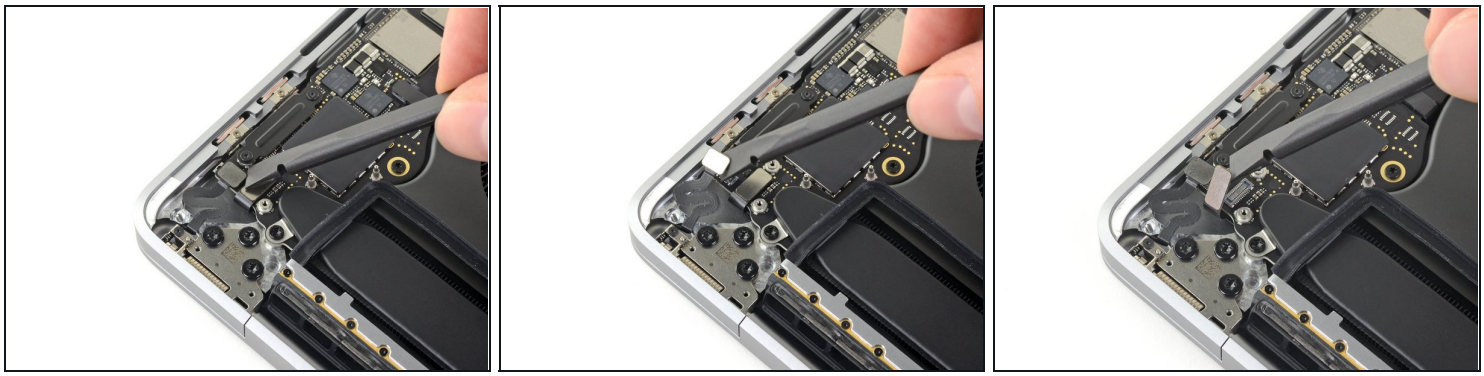






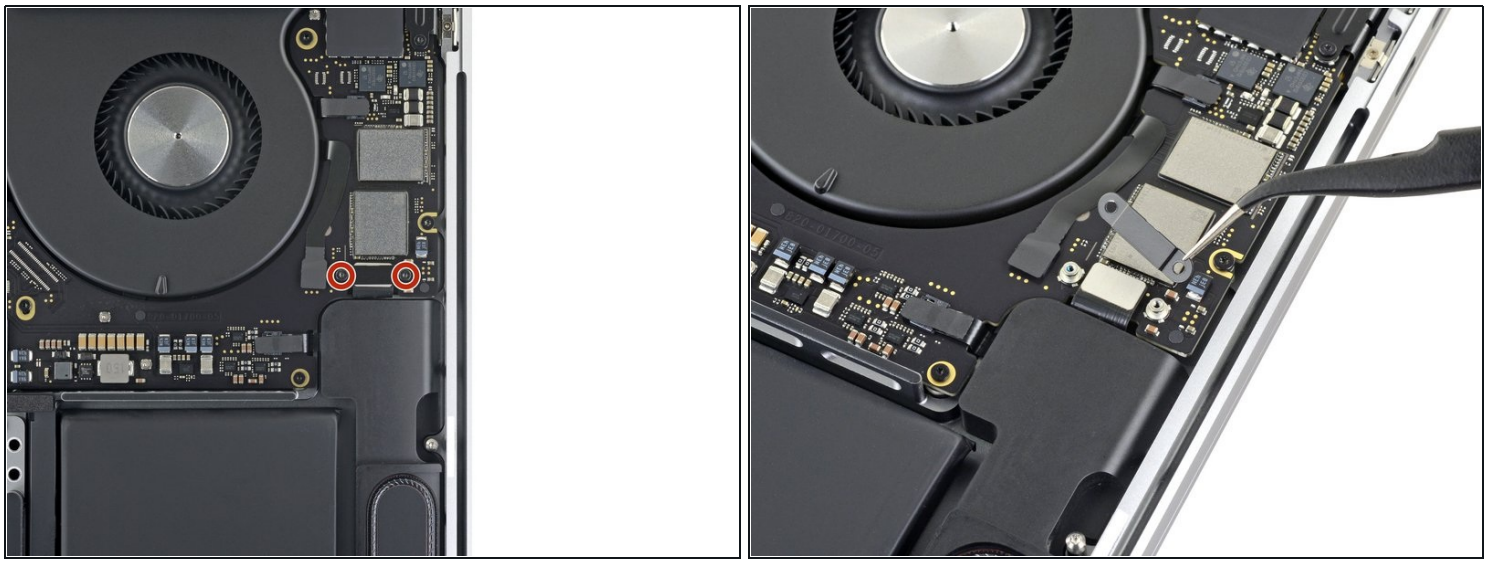
- Using your tweezers, slide the bracket toward the side edge of the MacBook Pro until it clears the slotted retaining tab on the logic board.
- Remove the bracket.

Step 34



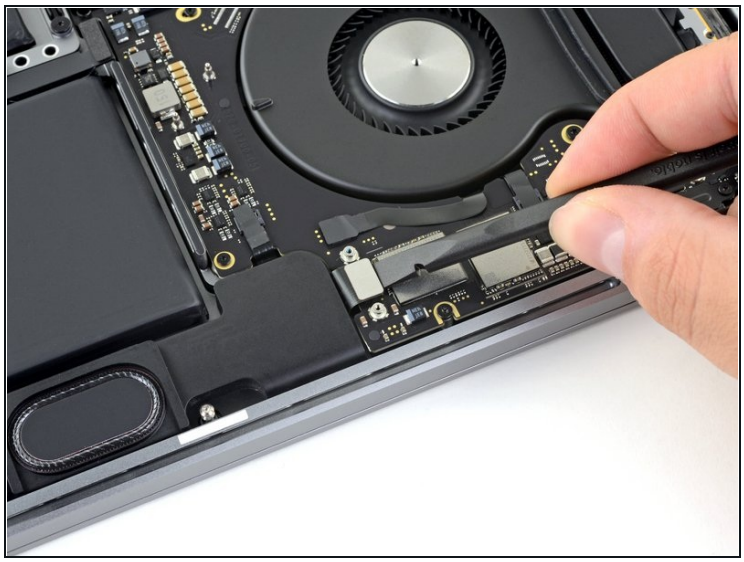
- Disconnect the lid angle sensor cable by prying it straight up from the logic board.
- Disconnect the Touch Bar digitizer cable by prying it straight up from the logic board.

Step 35 — Disconnect the Touch Bar display connector



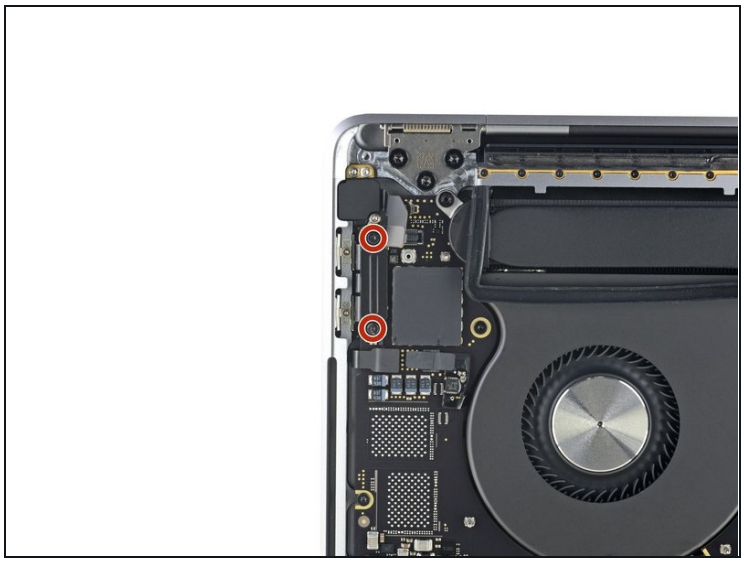
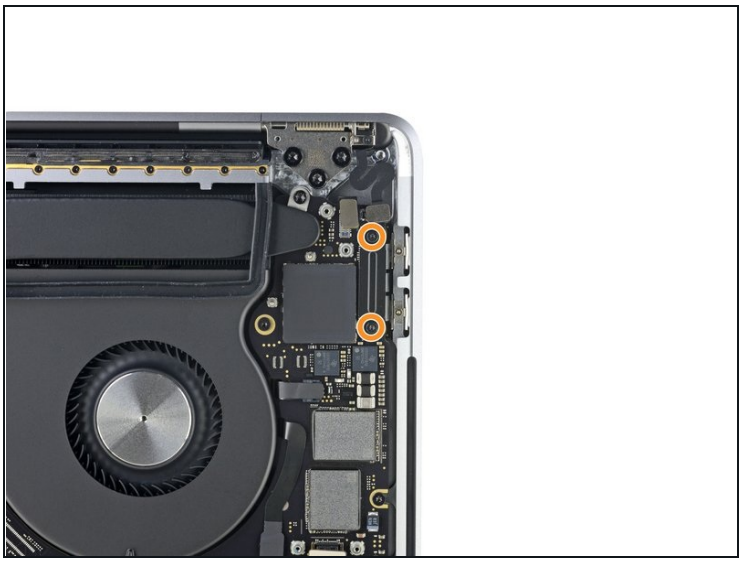
- Use a T3 Torx driver to remove the two 1.9 mm screws securing the bracket for the Touch Bar display cable connector.
- Remove the bracket.

Step 36



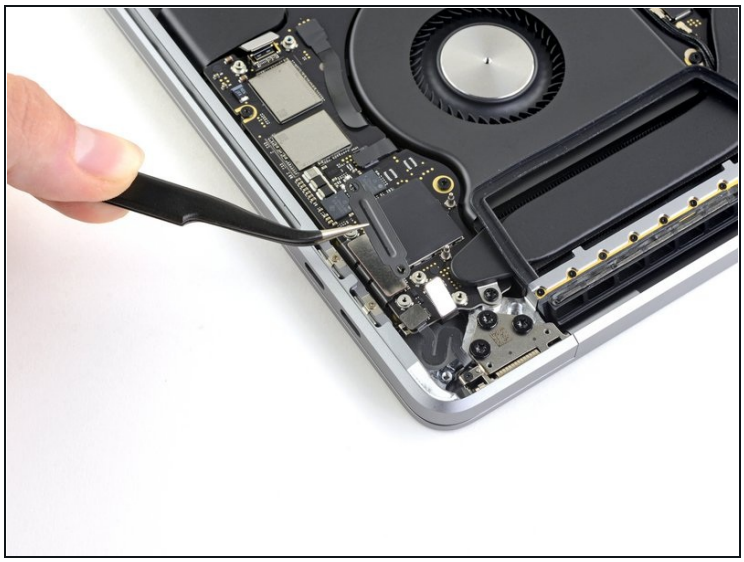
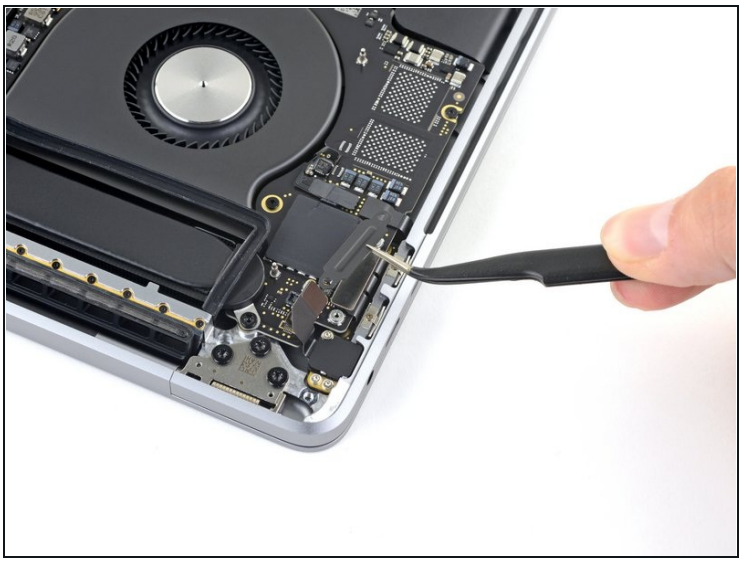

- Disconnect the Touch Bar display cable by prying its connector straight up from the logic board.

Step 37 — Disconnect the Thunderbolt cables

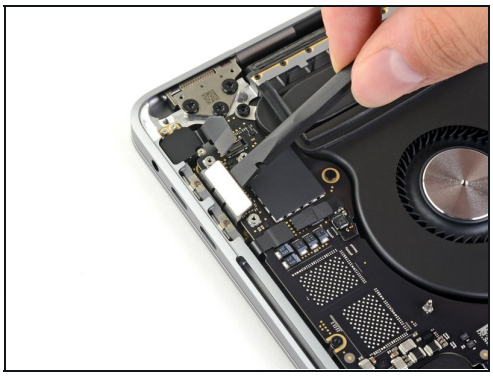
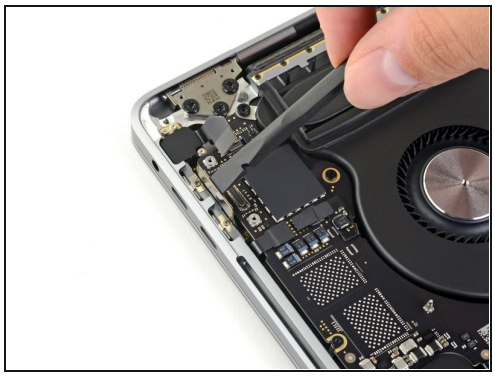
- Using a T3 Torx Driver:
  - Remove the two 1.3 mm screws securing the Thunderbolt flex cable cover on the left.
  - Remove two more 1.3 mm screws from the Thunderbolt cable cover on the right.

Step 38

- Remove the cover brackets from both Thunderbolt cable sockets.

Step 39

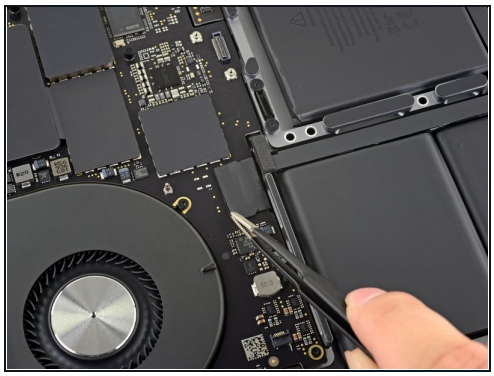




- Use a spudger to disconnect the left-side Thunderbolt flex cable by prying it straight up from the logic board.
  - Pry from the inside edge, nearest the fan.
- Gently push the flex cable connector off to the side so it doesn't interfere with logic board removal.

Step 40

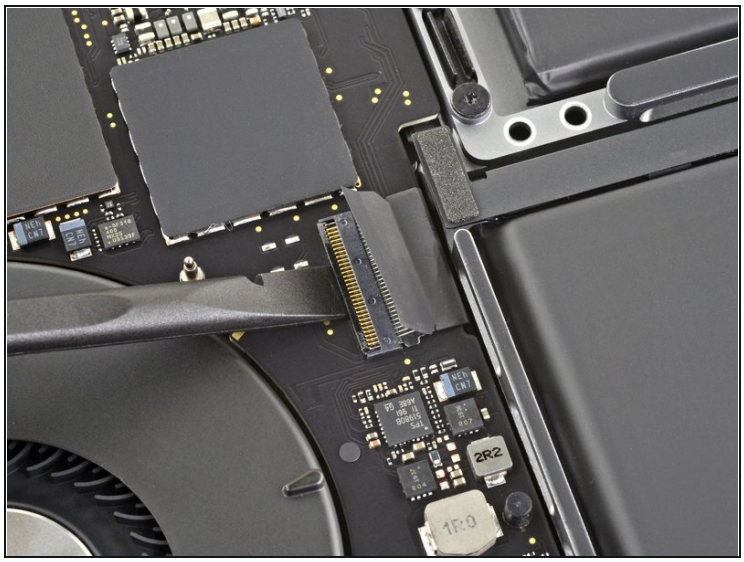
- Repeat to disconnect the Thunderbolt flex cable connector on the opposite side.
- Carefully push the flex cable connector aside so there's clearance for the logic board to come out without snagging.

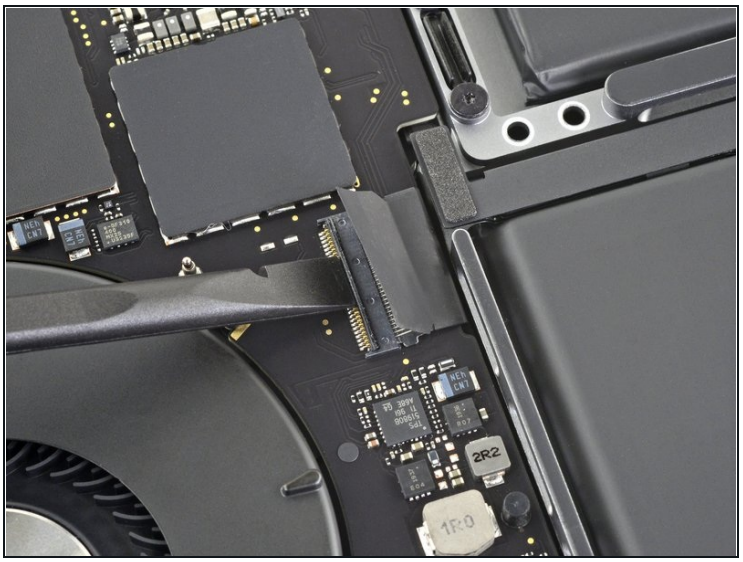
Step 41 — Disconnect the keyboard cable



- Peel back the tape covering the keyboard cable connector.

Step 42





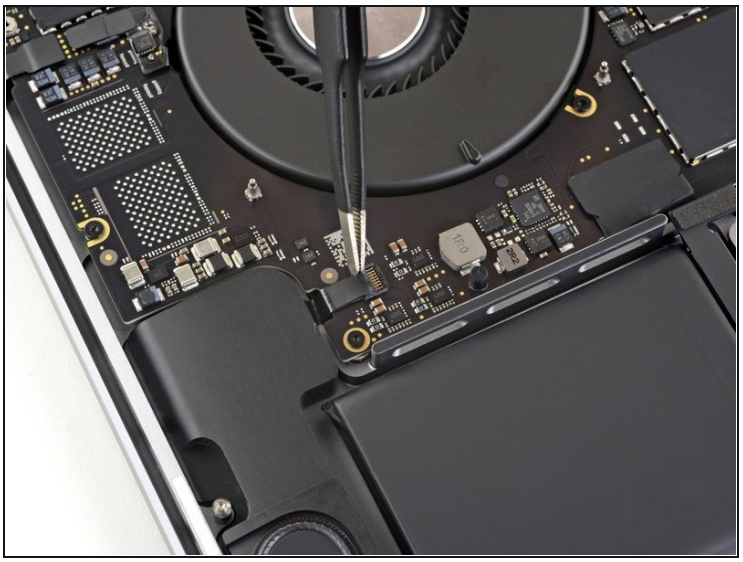
- Use a spudger to gently pry straight up on the long locking flap on the ZIF connector for the keyboard cable.

⚠ Because this ZIF connector is so long, the locking flap fragile. Be careful and pry up slowly and in the middle so it doesn't snap.

Step 43

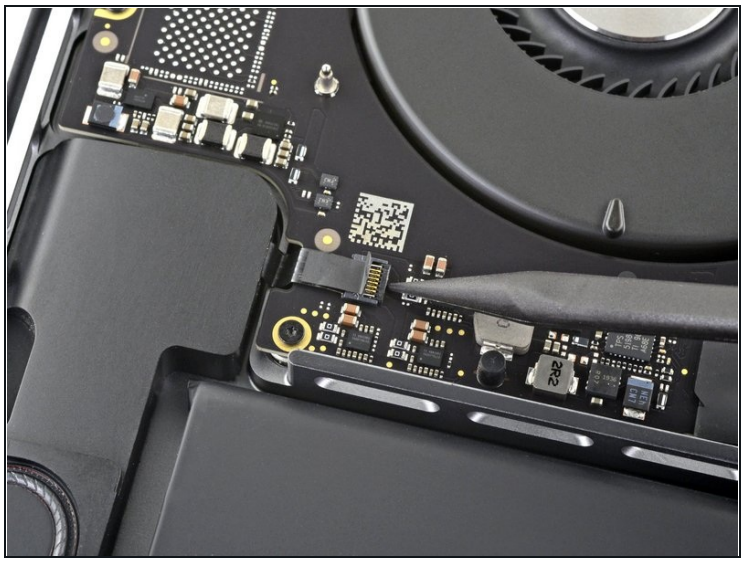
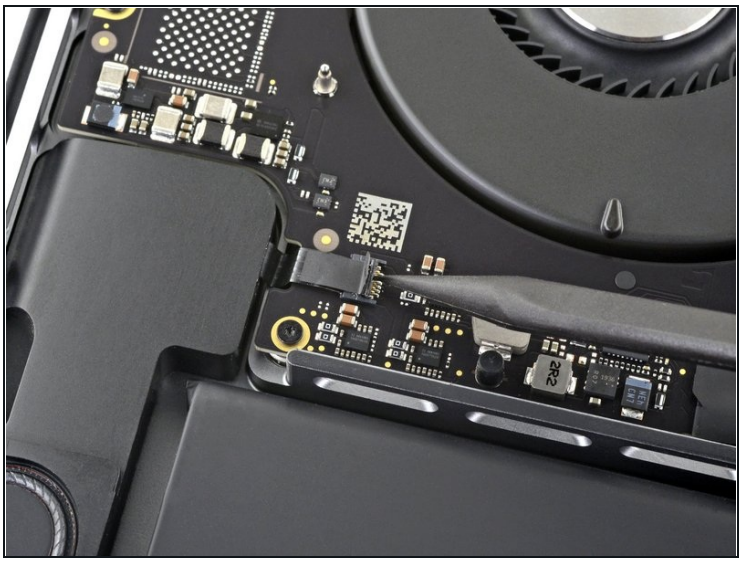

- Disconnect the keyboard cable by sliding it out from its socket on the logic board.
  - Pull in the direction of the cable.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 44 — Disconnect the right speaker

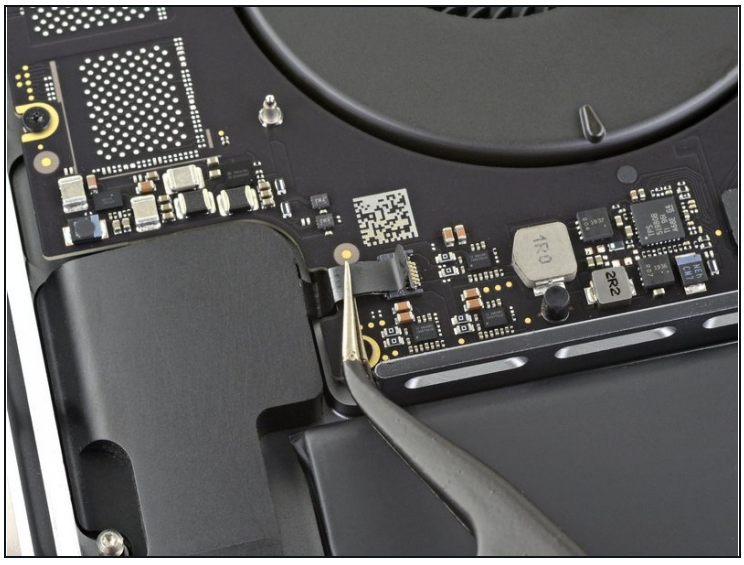
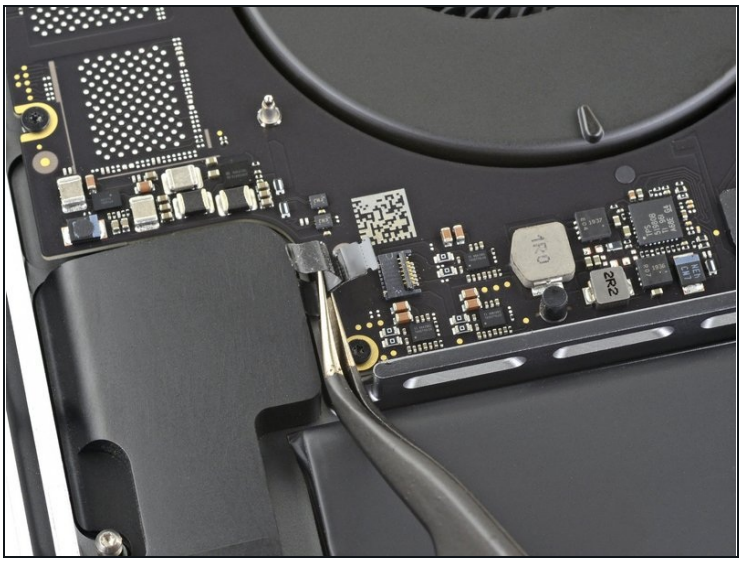
- Peel back any tape covering the left speaker cable connector.

Step 45

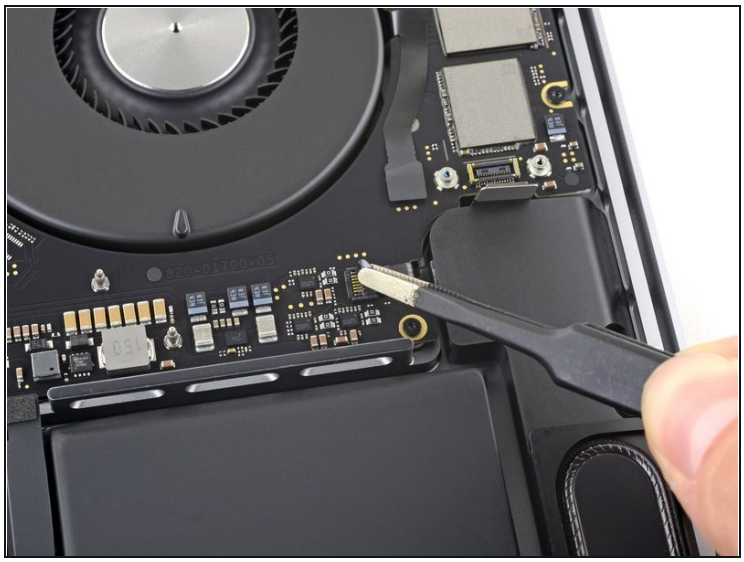
- Open the locking flap on the left speaker cable's ZIF connector by prying it straight up from the logic board.

Step 46

- Disconnect the left speaker by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 47 — Disconnect the left speaker

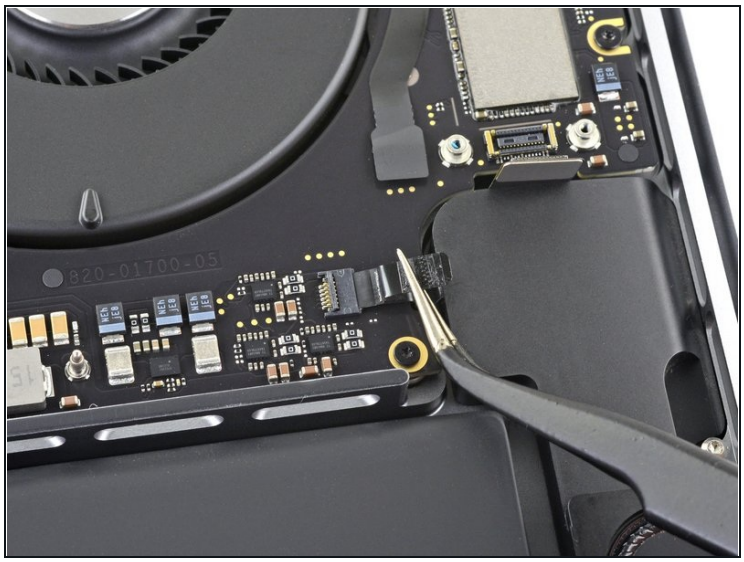


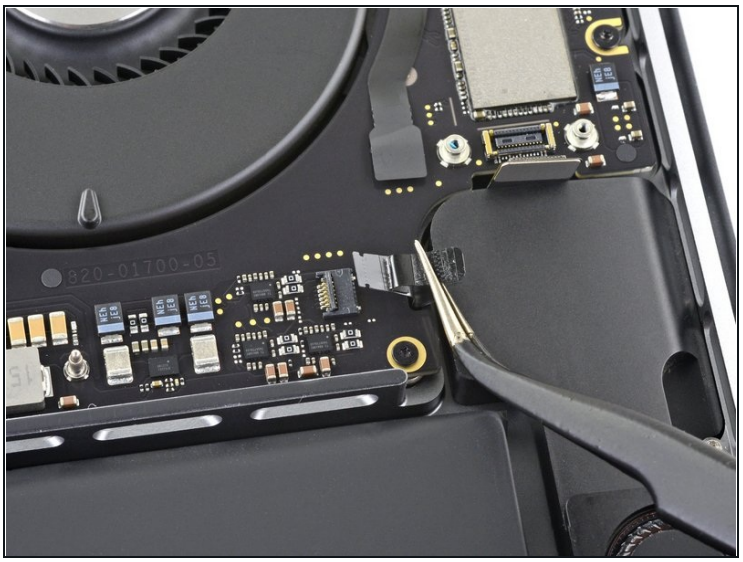

- Peel back any tape covering the right speaker cable connector.

Step 48


- Open the locking flap on the right speaker cable's ZIF connector by prying it straight up from the logic board.

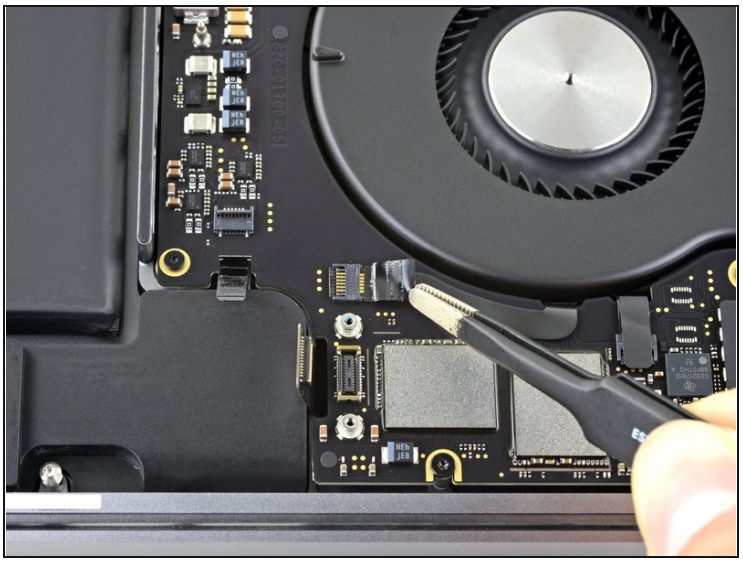
Step 49





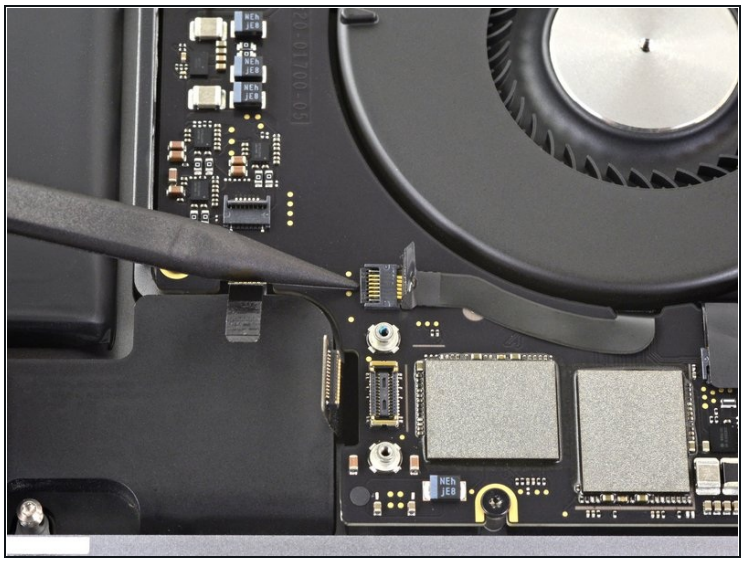
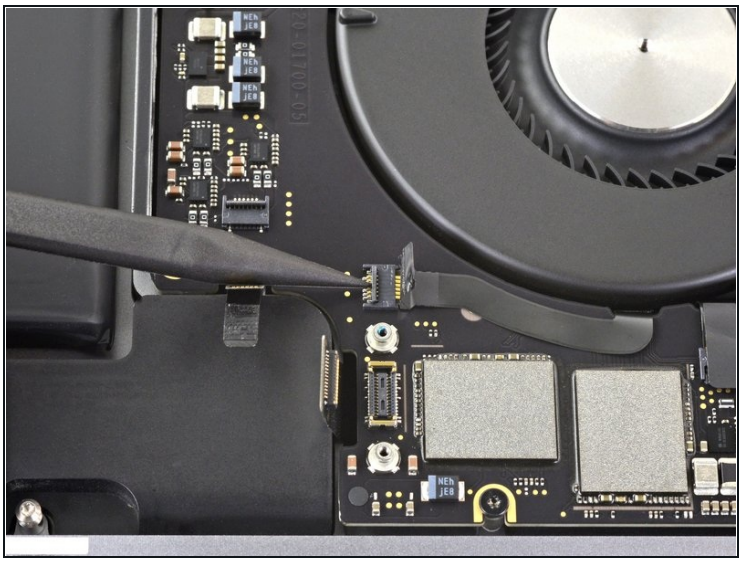
- Disconnect the right speaker by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 50 — Disconnect the keyboard backlight

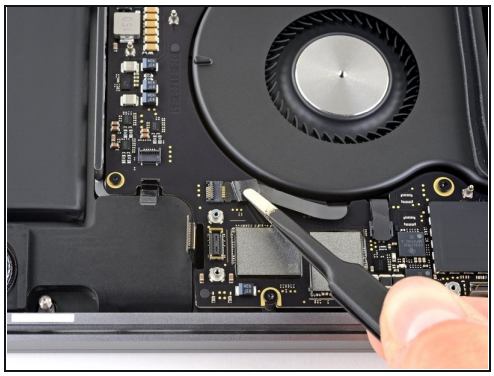
- Peel back any tape covering the first keyboard backlight cable connector.

Step 51

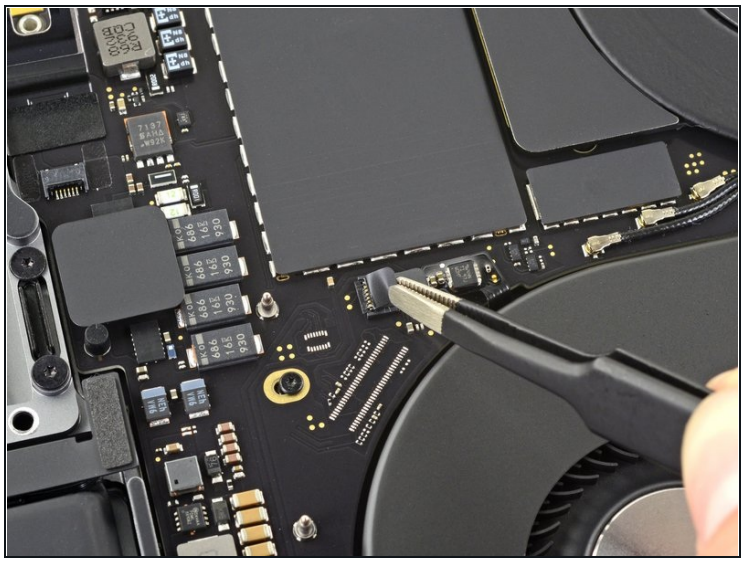
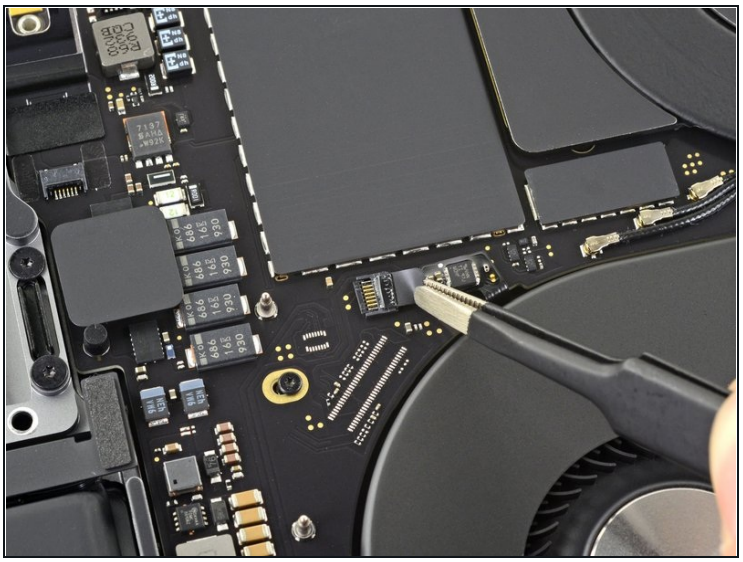
- Open the locking flap on the keyboard backlight's ZIF connector by prying it straight up from the logic board.

Step 52



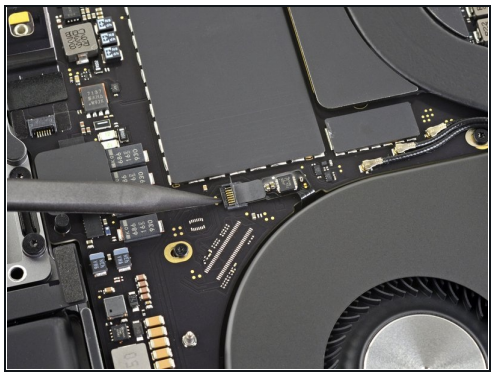
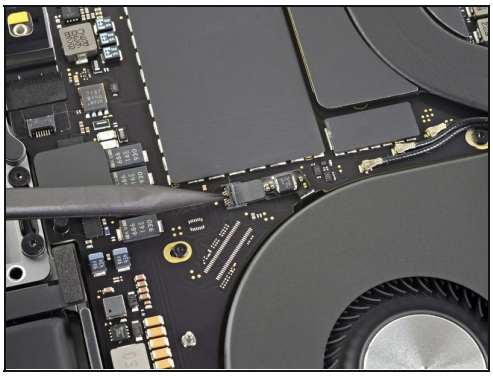
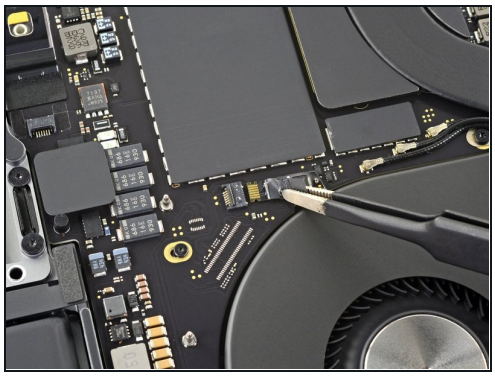
- Disconnect the keyboard backlight by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.
  - Move the cable away from its connector so it can more easily clear the logic board during removal.

Step 53 — Disconnect the right fan

- Peel back any tape covering the right fan connector.

Step 54

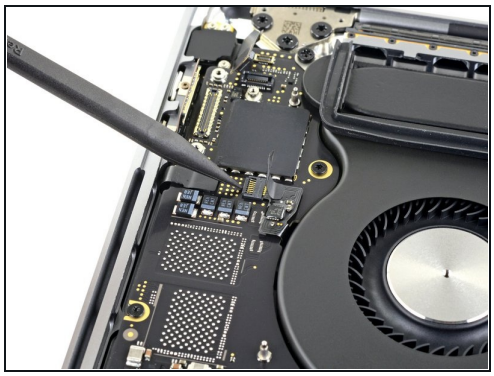
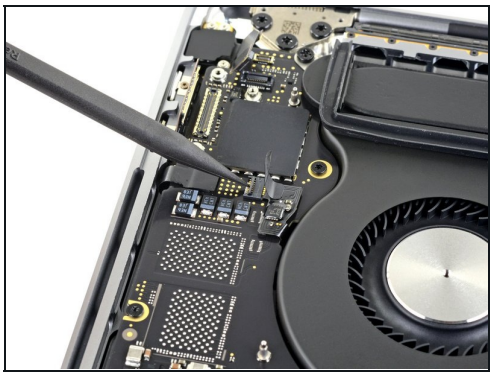




- Open the locking flap on the right fan's ZIF connector by prying it straight up from the logic board.
- Disconnect the right fan by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 55 — Disconnect the left fan

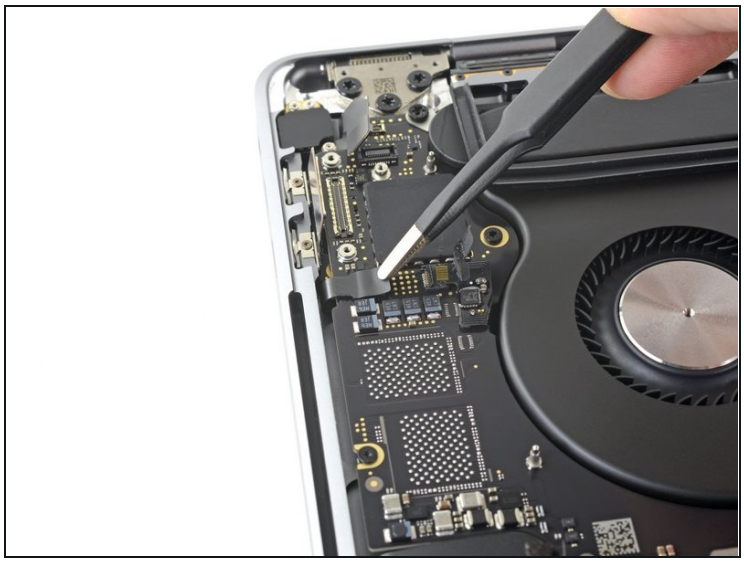
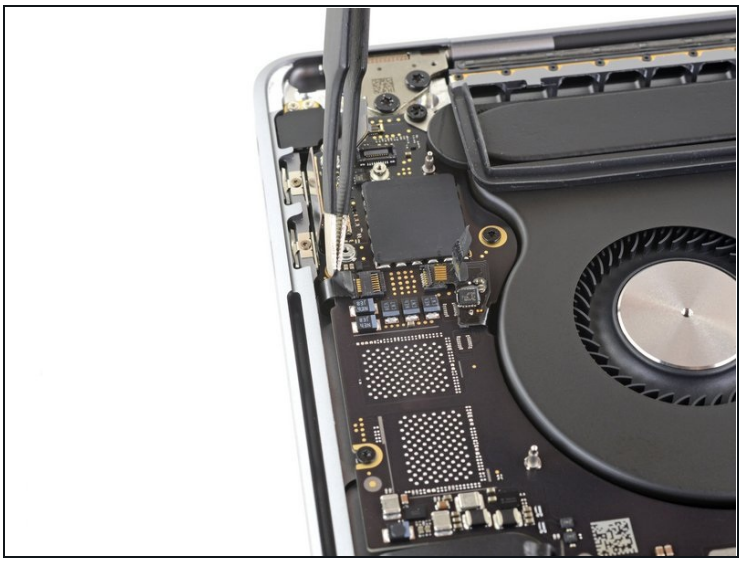

- Peel back any tape covering the left fan connector.

Step 56

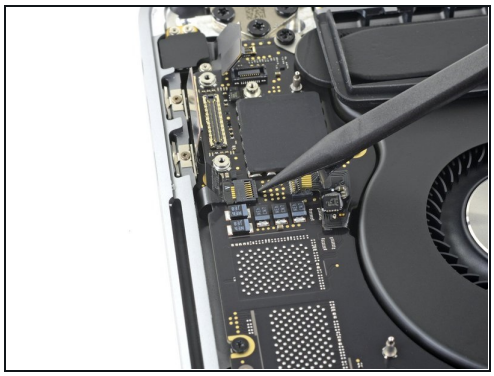
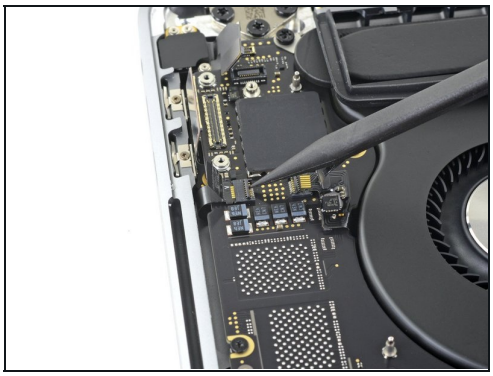
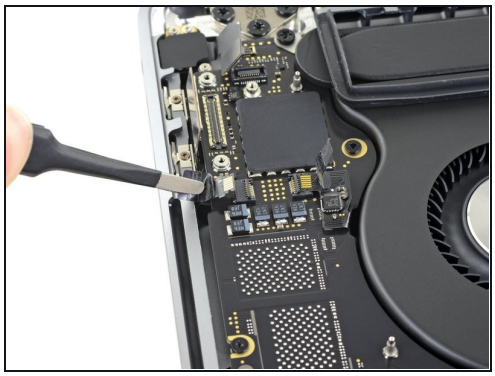

- Open the locking flap on the left fan's ZIF connector by prying it straight up from the logic board.
- Disconnect the left fan by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 57 — Disconnect the other keyboard backlight

- Peel back any tape covering the other keyboard backlight connector.

Step 58

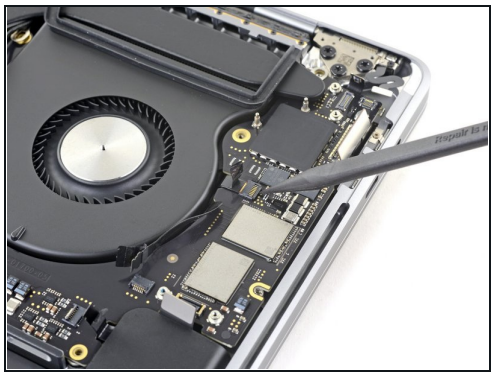
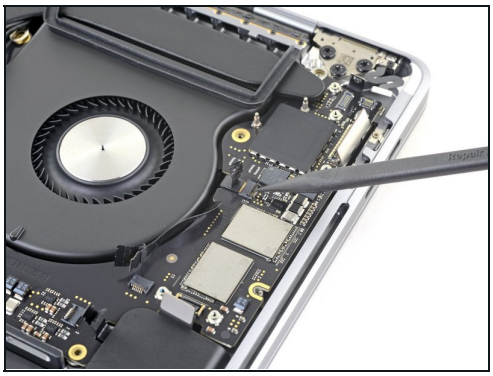




- Open the locking flap on the keyboard backlight's ZIF connector by prying it straight up from the logic board.
- Disconnect the keyboard backlight by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 59 — Disconnect the microphone array

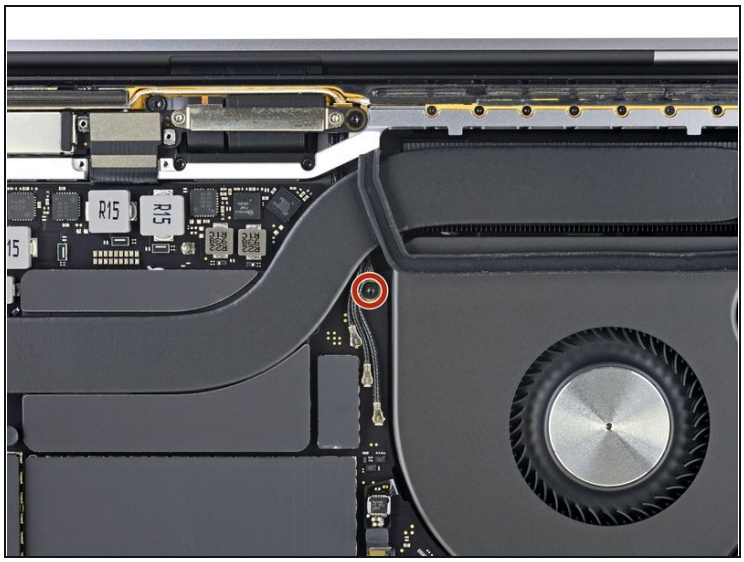
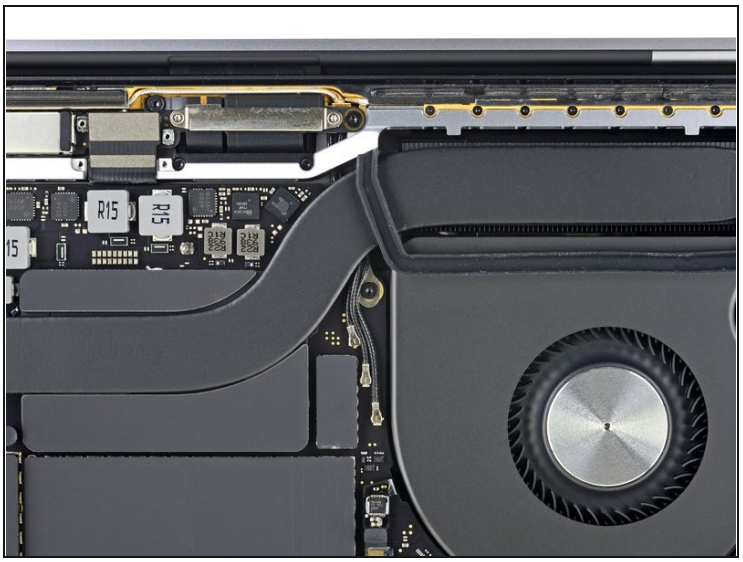

- Peel back any tape covering the microphone array connector.

Step 60

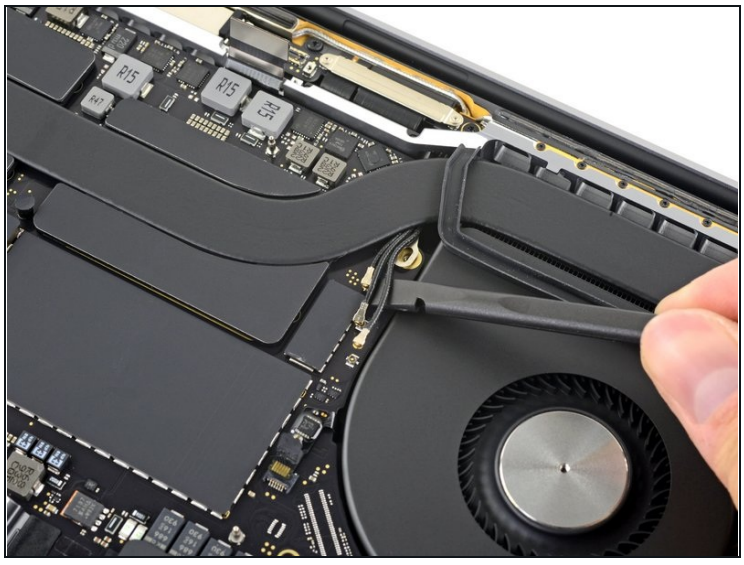
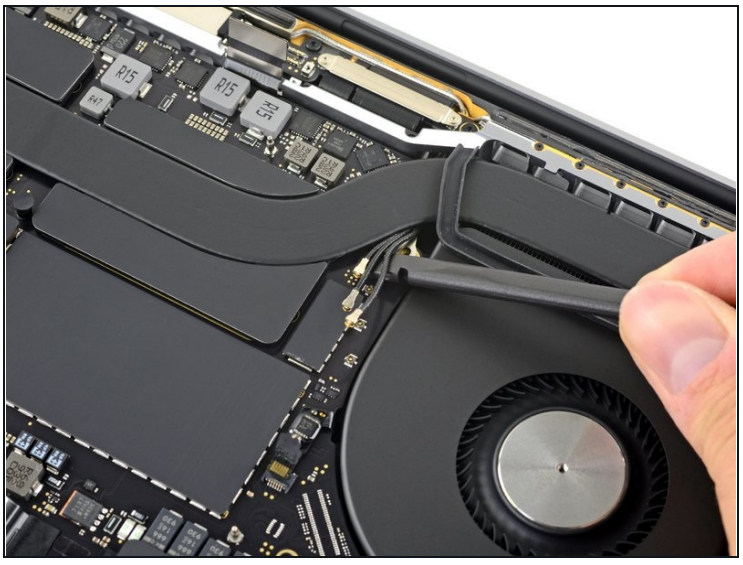

- Open the locking flap on the microphone array's ZIF connector by prying it straight up from the logic board.
- Disconnect the microphone array by pulling its cable away from the logic board until it releases from its socket.
  - If possible, pull on the tape attached to the cable, rather than the cable itself, to reduce the risk of damage.

Step 61 — Disconnect the antenna bundle

- Use a T5 Torx driver to remove the single 2.9 mm screw securing the antenna cable bundle.

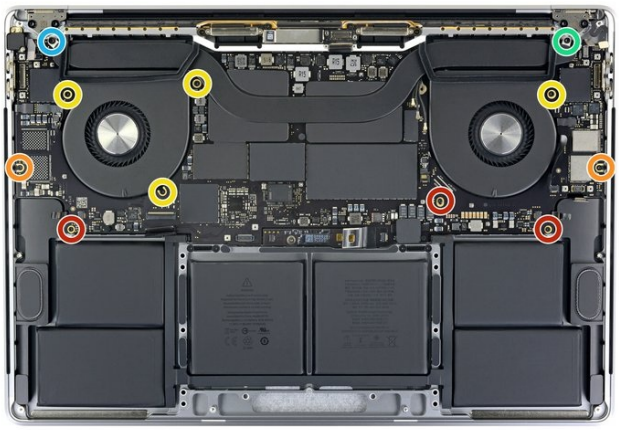
Step 62

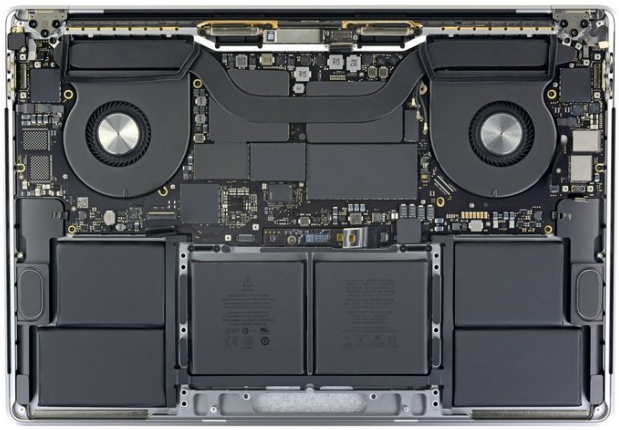



- Disconnect all three antenna cables by prying each one straight up from its socket.
  - Slide your tweezers or the flat end of your spudger underneath each cable until it's near the socket, and then gently twist or pry up to disconnect it.

To reconnect each cable, align the connector directly over its socket, and then press down so it snaps into place.

Step 63 — Remove the logic board screws

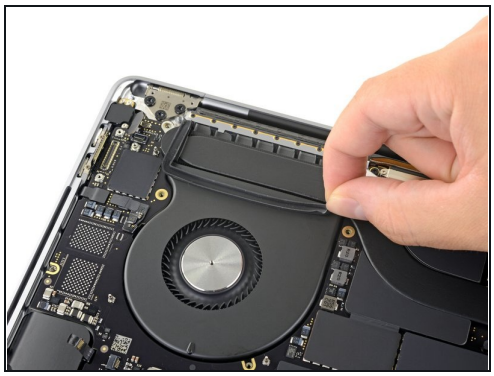
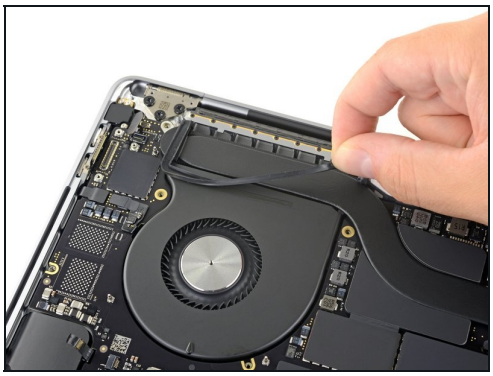
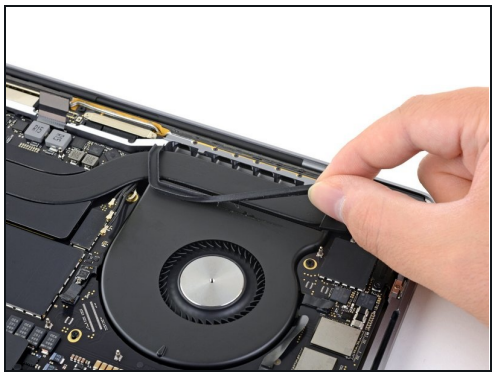




- Remove all eleven screws securing the logic board assembly:
  - Three 3.3 mm T3 Torx screws
  - Two 3.6 mm T5 Torx screws
  - Four 2.9 mm T5 Torx screws
  - One 4.0 mm T8 Torx screw
  - One 4.0 mm T8 Torx screw (large head)

During reassembly, install these screws only loosely. Adjust the board position if necessary until all the connectors line up, and then tighten the screws.

Step 64 — Remove the logic board

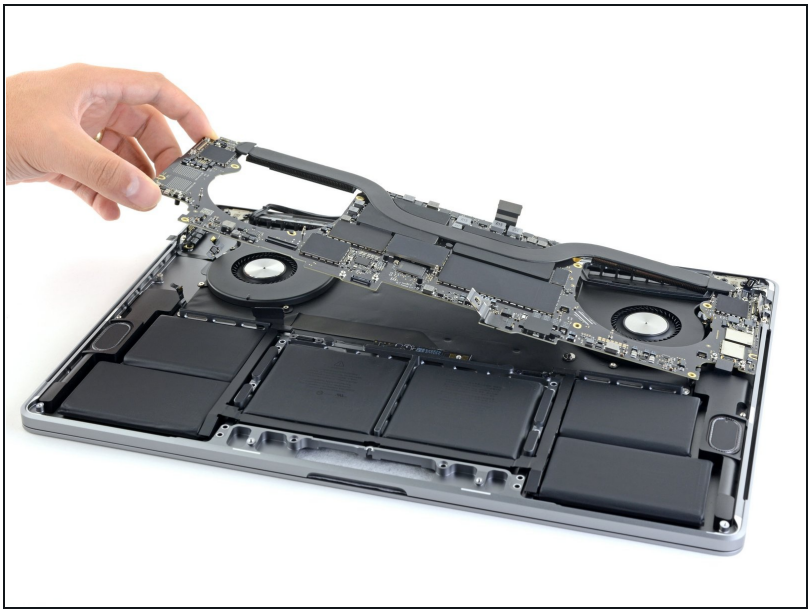
- Peel up (but don't remove) the rubber vibration damping strip from the adhesive holding it to the fan.
  - If needed, apply mild heat with an iOpener, hair dryer, or heat gun to soften the adhesive and make the dampers easier to separate.
- Repeat for the other adhesive strip on the opposite fan.

Step 65


ⓘ The logic board assembly is a tight fit, but you can make it easier to remove by inserting a spudger under the left edge and levering it up **slightly**.

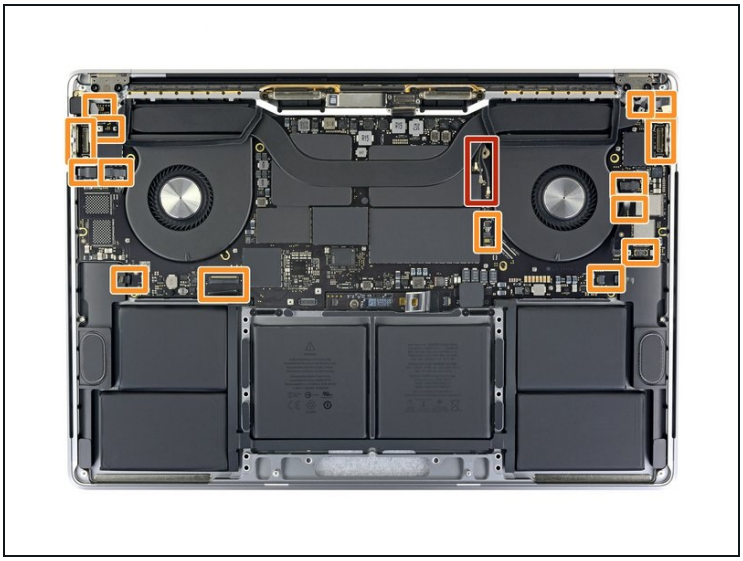
⚠ There should be no resistance as you remove the logic board. Check all cables carefully and hold them out of the way if needed so they don't snag on the board.

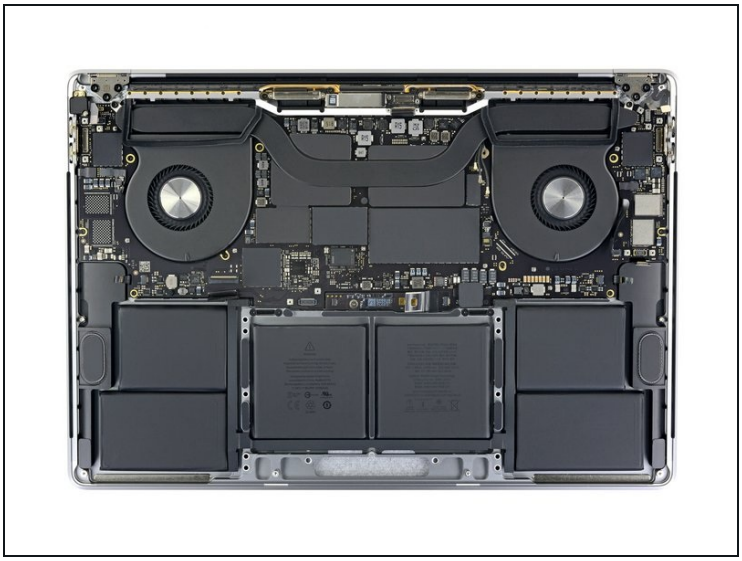
Step 66



- Lifting from the left side, remove the logic board.

Step 67





When reinstalling the logic board assembly:

- Feed the antenna cable bundle through the gap between the logic board and heat sink, and make sure it lines up correctly as you lower the board into place.
- Verify that no cables get trapped under the board as you install it. Check each of the fifteen marked locations carefully.

Step 68 — Battery

- Use a T5 Torx driver to remove the 5.1 mm screw securing the battery board.

Step 69

⚠ The liquid adhesive remover provided in your kit can damage the antireflective coating on your MacBook Pro's display, as well as the plastic keyboard keys.

- To protect your display, place a sheet of aluminum foil between the display and keyboard and leave it there while you work.

- Additionally, use painter's tape to seal off the area under the trackpad as best you can. Optionally, you may also layer an absorbent towel directly underneath the trackpad area to soak up any excess adhesive remover.

Step 70

- To control the flow of adhesive remover, raise the back edge (hinge side) of your MacBook Pro a few inches using a book or foam block.

Step 71

- Now that your MacBook Pro is fully prepped, it's time to prep yourself.

⚠ 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 possible skin irritation, put your gloves on now.

Step 72



- 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.

ⓘ 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.

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

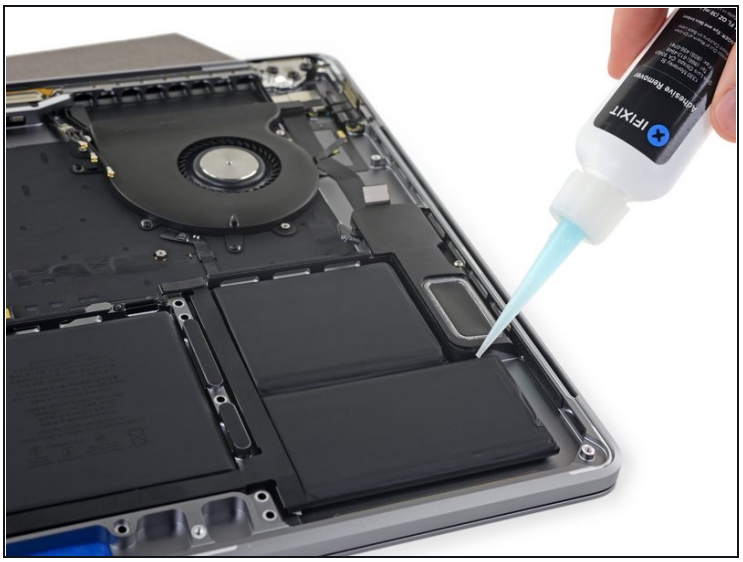
⚠ Twist and close the bottle cap securely before you proceed further.

Step 73

- Apply a few drops of adhesive remover underneath the two battery cells on the right, starting along the edge nearest the fan.

ⓘ You don't need to use very much. The small bottle contains more than twice the amount of solvent needed to remove all the battery cells.

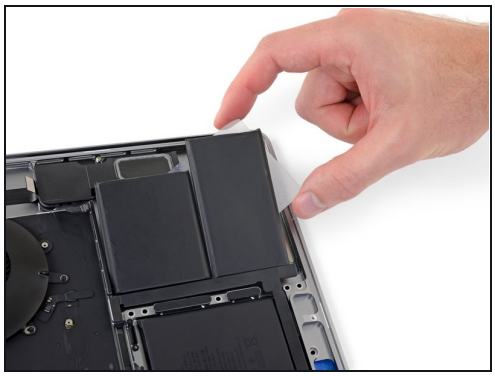
Step 74



- Add a few more drops of adhesive remover in between the two battery cells on the right, so that it flows down underneath the lower battery cell.
- Wait about two minutes for the liquid adhesive remover to penetrate and weaken the battery adhesive before you proceed to the next step.

Step 75





- After a couple minutes, insert one corner of a plastic card underneath the battery, starting from the lower edge of the bottom, right-most cell.

  ⚠ This shouldn't require much force. If you have trouble, apply more adhesive remover 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.

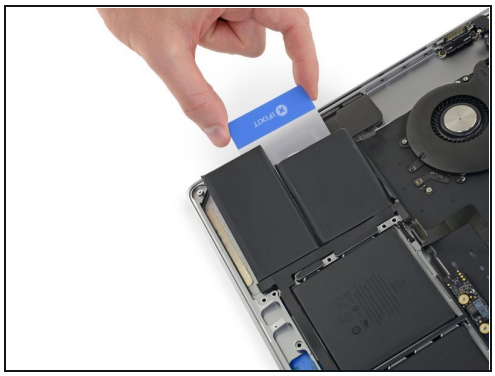
- Wiggle the card from side to side and slide it all the way underneath both battery cells.

- Lift the cells to fully separate the adhesive, but don't try to remove them from your MacBook yet.

- Leave the plastic card temporarily underneath the cells to prevent the adhesive from re-bonding as you proceed to the next step.

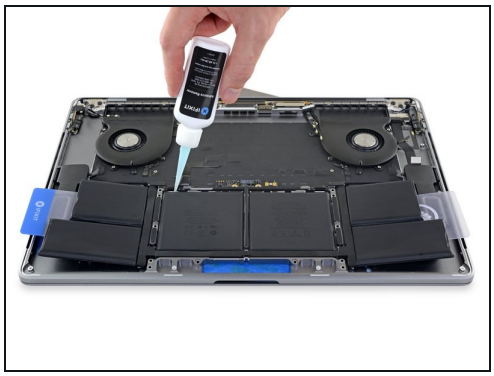
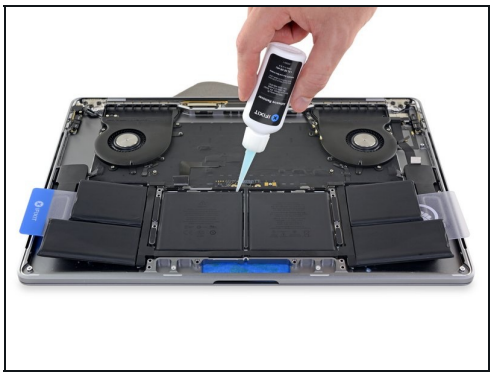
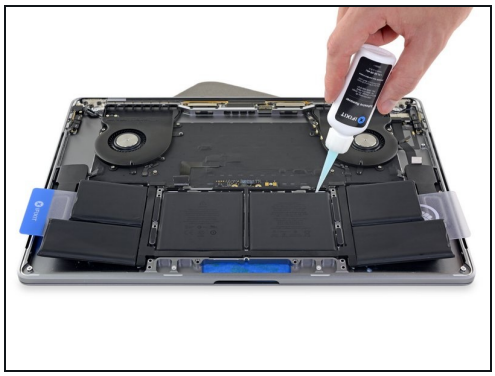
Step 76





- Switch to the left side of the MacBook Pro, and repeat the previous step to separate two more battery cells.
- Leave the second plastic card in place temporarily.

Step 77

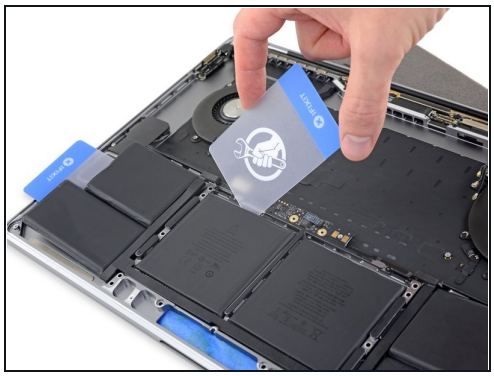
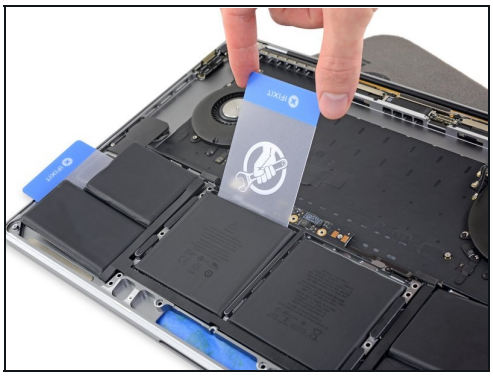
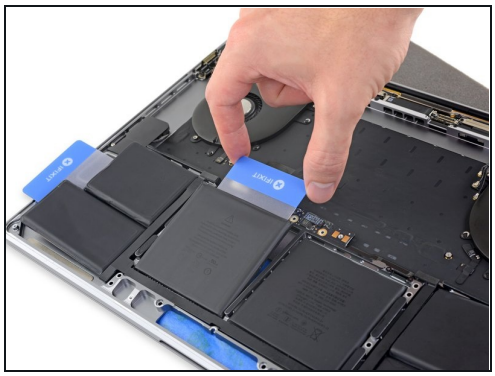




- Apply a few drops of adhesive remover along the top edges of the two center battery cells.

ⓘ There are openings in the chassis underneath these two cells, which allow the adhesive remover to leak through and may prevent it from fully penetrating.

- Be mindful of leaks, and apply more adhesive remover along the side edges if needed.

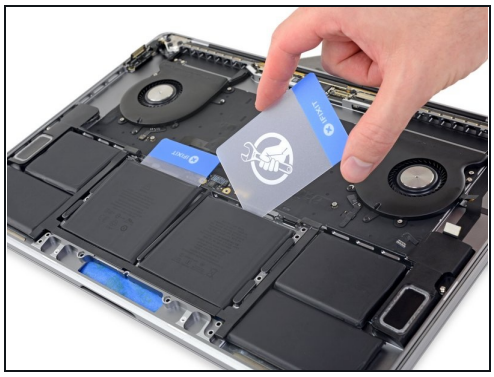
Step 78

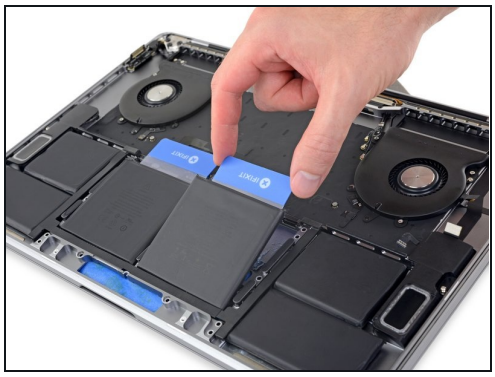




- After a couple minutes, retrieve your first plastic card and insert one corner under the top edge of one of the center battery cells.
- Wiggle it from side to side and slide it underneath the battery cell until all the adhesive separates.

⚠ If you have trouble, don't use excessive force and don't deform the battery. Apply more adhesive remover and try again, or skip down two steps for an alternate method.

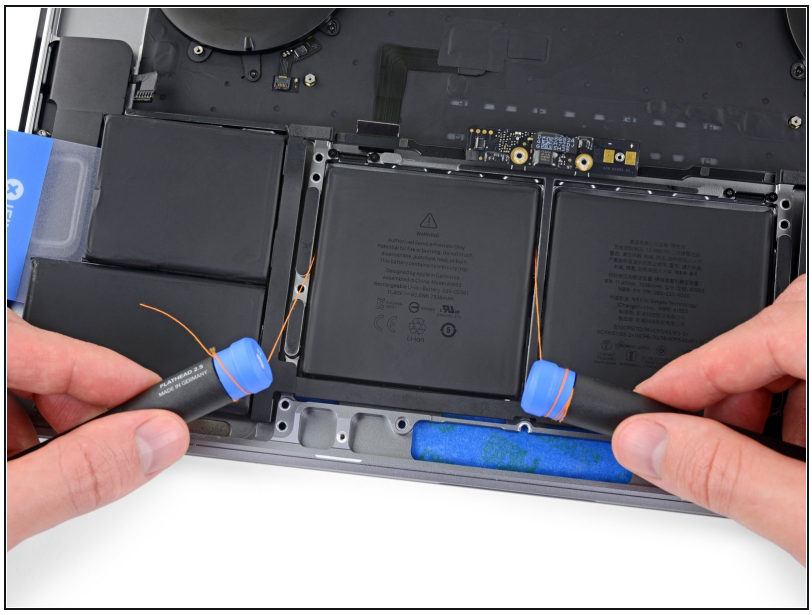
Step 79





- Retrieve your second plastic card and repeat the previous step to separate the remaining center battery cell.

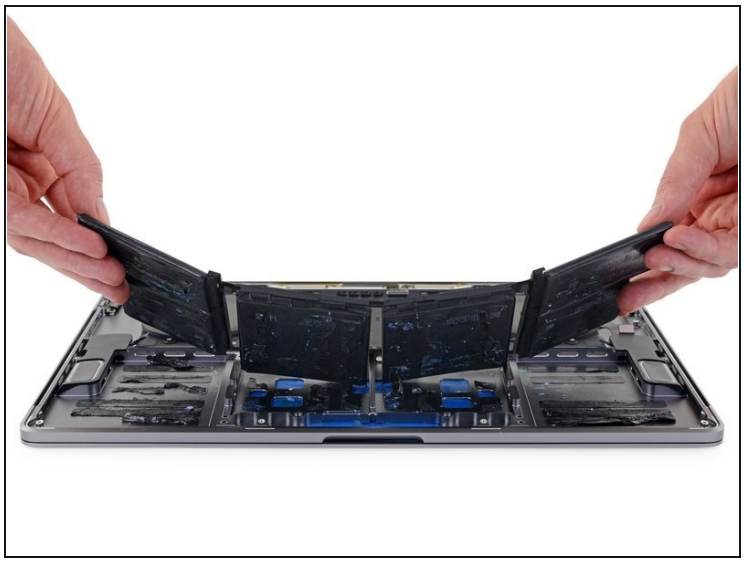
Step 80



- If you had trouble getting the card underneath any of the battery cells, 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.

⚠ Wear thick gloves or wrap the floss around a couple of driver handles so as not to hurt your fingers.

Step 81

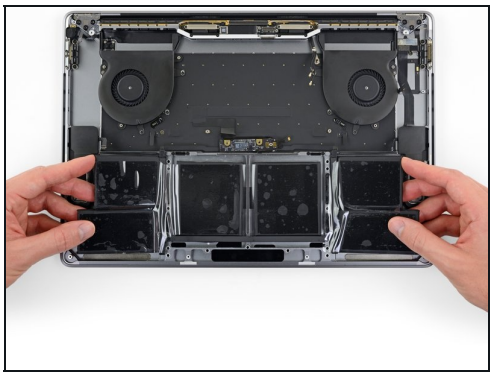


- Lift and remove the battery.

Before installing a new battery, remove all remaining adhesive from the MacBook Pro's case.

- Peel off any large strips of adhesive using tweezers or gloved fingers.
- Scrape away any remaining chunks of 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 the chassis is clean and ready for your new battery.
- This can take quite a bit of work, so be patient.

Step 82


Double-check the fit and alignment of your new battery before sticking it down.

- If your battery came with adhesive pre-installed on the bottom, flip it over and carefully peel away the liner to expose the adhesive. If your battery did not come with adhesive, apply a thin double-sided adhesive tape such as Tesa 61395 to keep your battery in place.
- 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.

To reassemble your device, follow the above steps in reverse order.

Take your e-waste to an R2 or e-Stewards certified recycler.

Repair didn’t go as planned? Ask our Answers community for troubleshooting help.