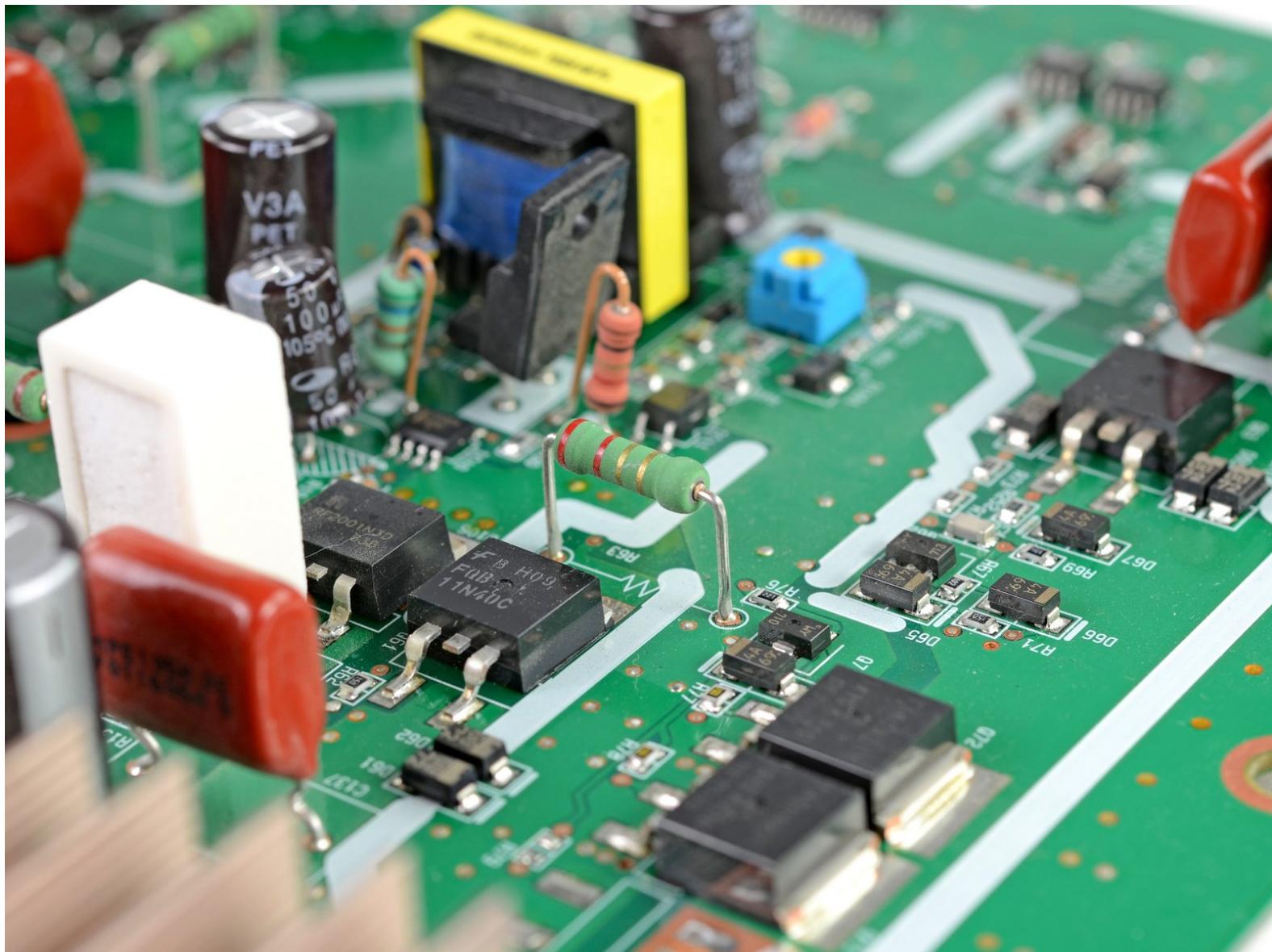




# How To Solder and Desolder Connections

This guide will show you how to solder and desolder electrical connections on both Thru-Hole and Surface Mount (SMT) printed circuit boards (PCBs).

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## INTRODUCTION

Newer generations of iPhone, iPod nano, and iPod touch have batteries that are soldered directly to the logic board. This makes replacing the battery a much harder feat than other iPod and iPhone models, who use connectors to attach the battery to the logic board. This guide illustrates the various levels of difficulty in soldering, and teaches the technique of soldering three types of connections commonly seen in electronic gadgets:

[Step 1: Beginning](#) — Large thru-hole components, such as cylindrical capacitors;

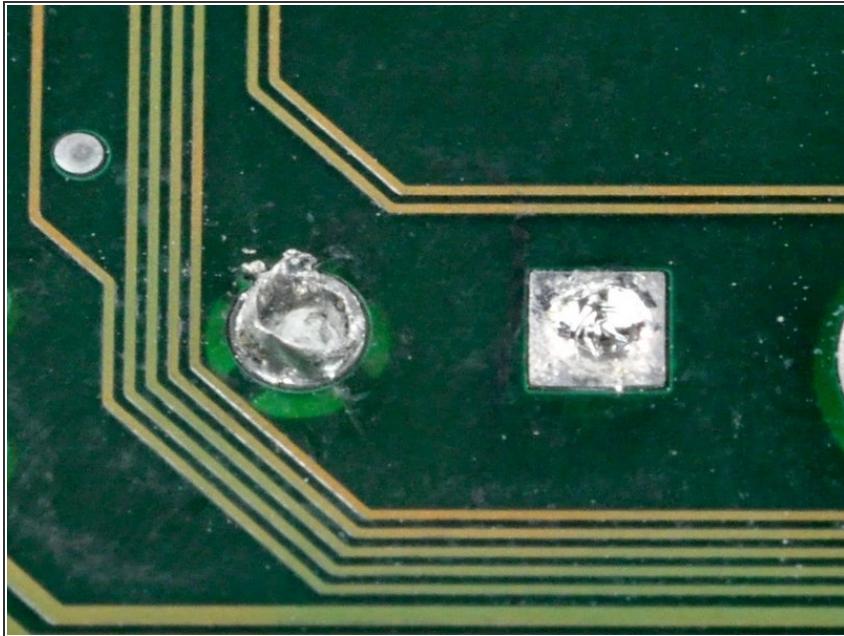
[Step 7: Intermediate](#) — Small thru-hole components, such as battery leads and resistors; and

[Step 11: Advanced](#) — Small surface-mount components.

## TOOLS:

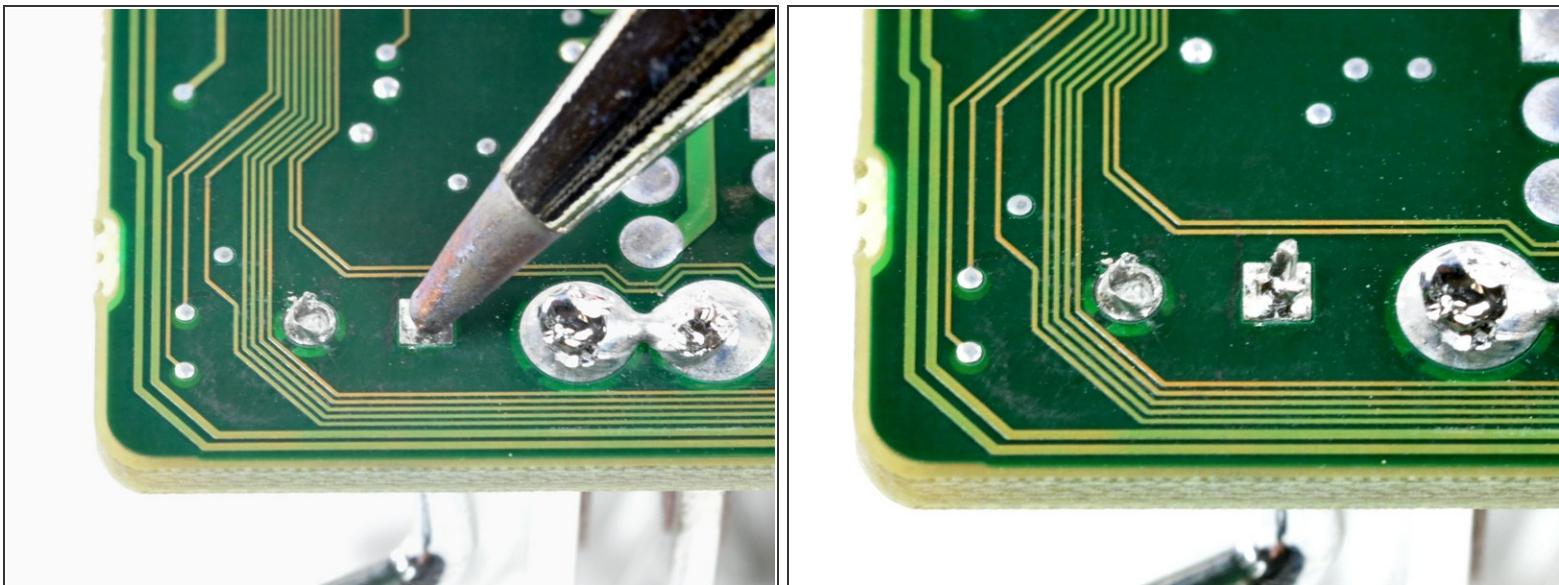
- [Desoldering Braid](#) (1)
- [Solder](#) (1)
- [Soldering Iron](#) (1)
- [Staples](#) (1)

## Step 1 — Beginning Guide



- ⓘ To start, let's solder a large component held to a circuit board with [thru-hole](#) solder pads.
- A capacitor was already removed from the two solder pads. Each pad was heated while the capacitor was pulled away from the board.
- ☒ Notice how the solder holes are completely covered with solder. Opening these holes -- so the capacitor lead can be pushed through -- will greatly simplify installation.

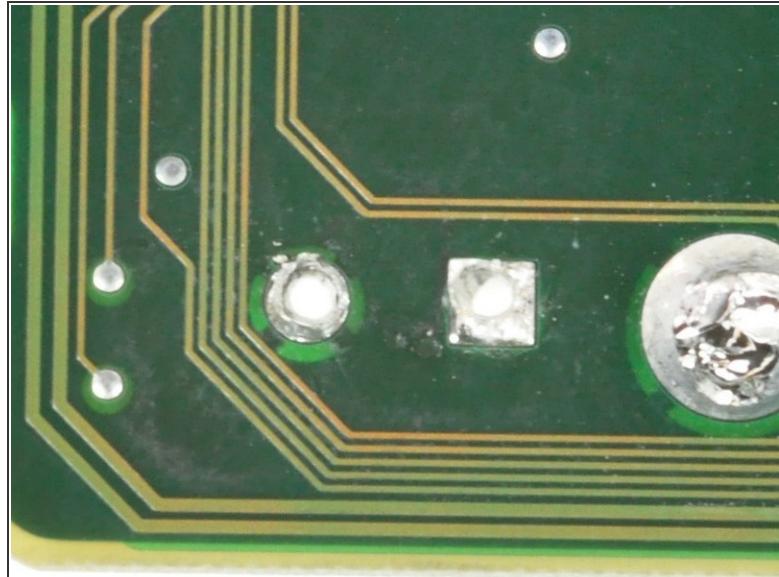
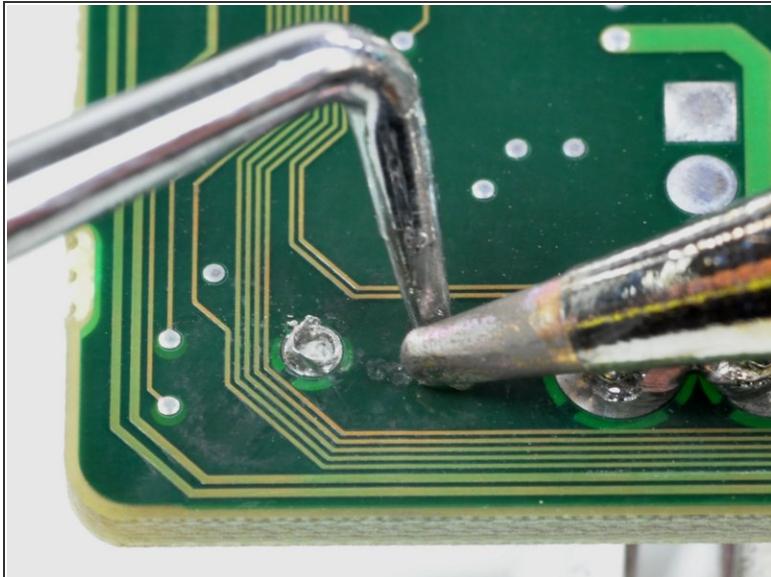
## Step 2



- To open the hole blocked by solder, heat the solder pad with the tip of a soldering iron. Push through the molten solder from the other side with a staple or sewing needle.
- ① In our case, we decided to use a right angle pick. Lead solder will not stick to steel, so pretty much any thin steel can be used.

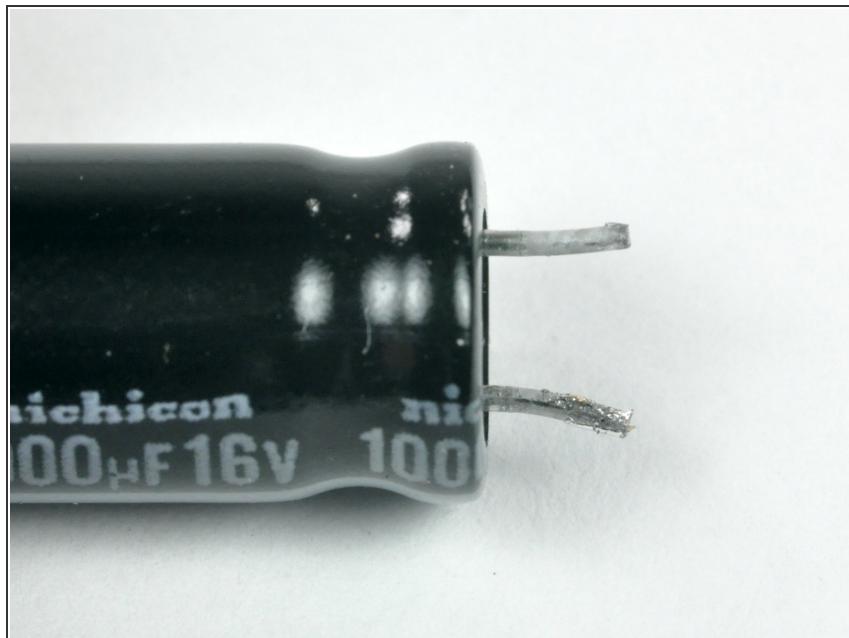
**⚠** Pushing the tool all the way through the hole may require heating the pad several times. As a rule of thumb, heat the solder just enough for it to melt, then remove the soldering tip from the pad. Excessive heat will damage electronic components.

### Step 3



- When the tool has completely passed through the hole, enlarge the hole by heating the top side of the solder pad while pressing through with the tool.
- ① Both solder holes should now be open enough to insert the bare leads of your component.

## Step 4

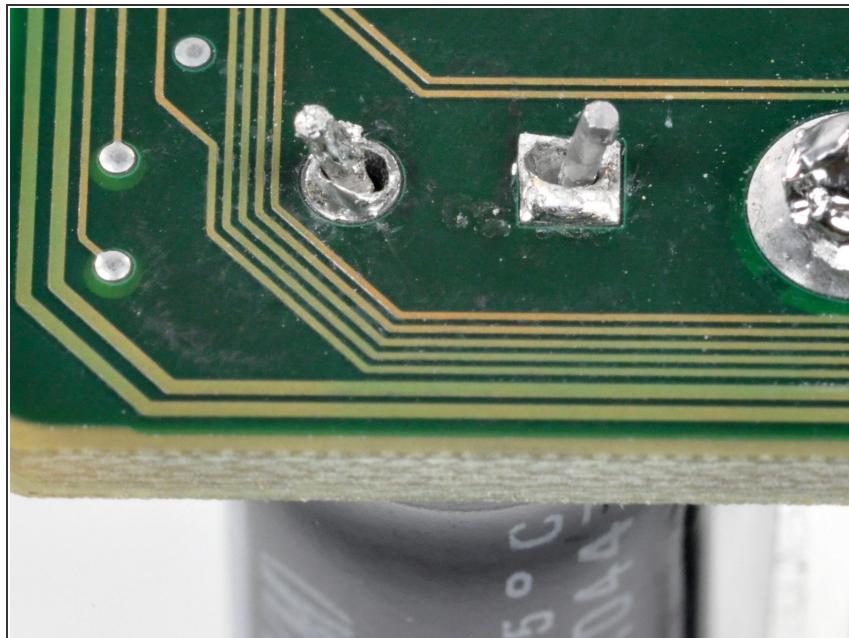


ⓘ Prepare your component for soldering by removing any excess solder from the contacts. The contacts should be clean enough to pass through the solder pad holes.

- Run the soldering iron tip down the lengths of each contact to wipe the solder away from the component. Clean the iron's tip between strokes by wiping it against a moist sponge.

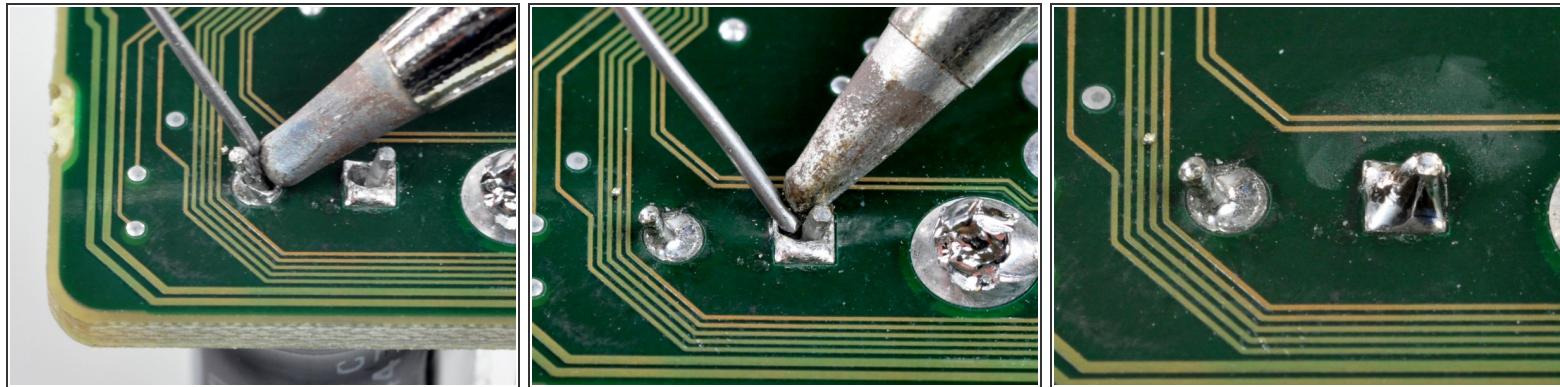
⚠ Excessive heat will damage the components, so do not apply the soldering iron to the component for long amounts of time.

## Step 5



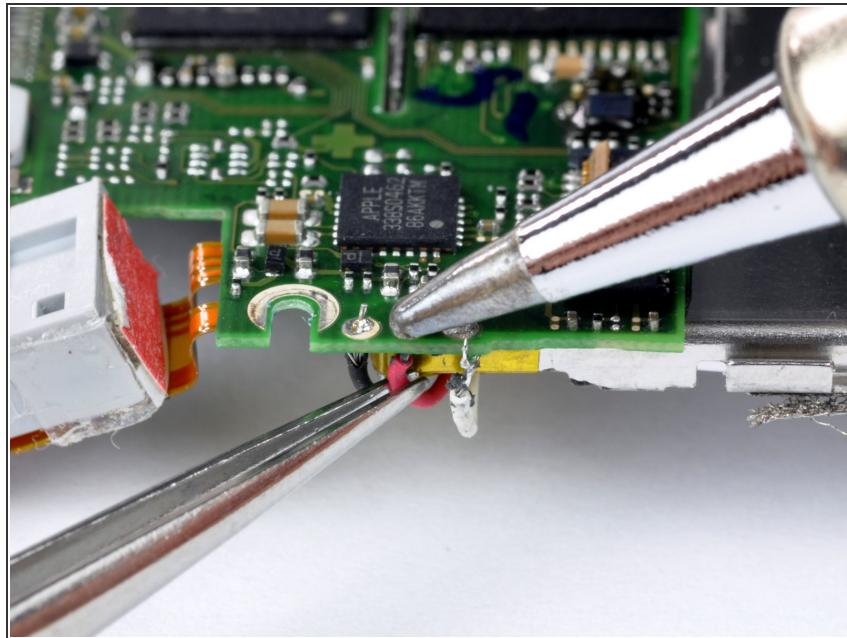
- Insert the contacts into and through the holes made in the solder pads.
- To ease in soldering, slightly bend the contacts protruding through the holes so they hold themselves in place.

## Step 6



- To solder each connection:
  - Place the tip of the soldering iron against the solder pad.
  - Melt just enough solder onto the solder pad so that the capacitor's contact lead holds firmly in place.
  - Remove both the solder and the soldering iron tip from the connection as soon as enough solder melts onto the pad.

## Step 7 — Intermediate Guide

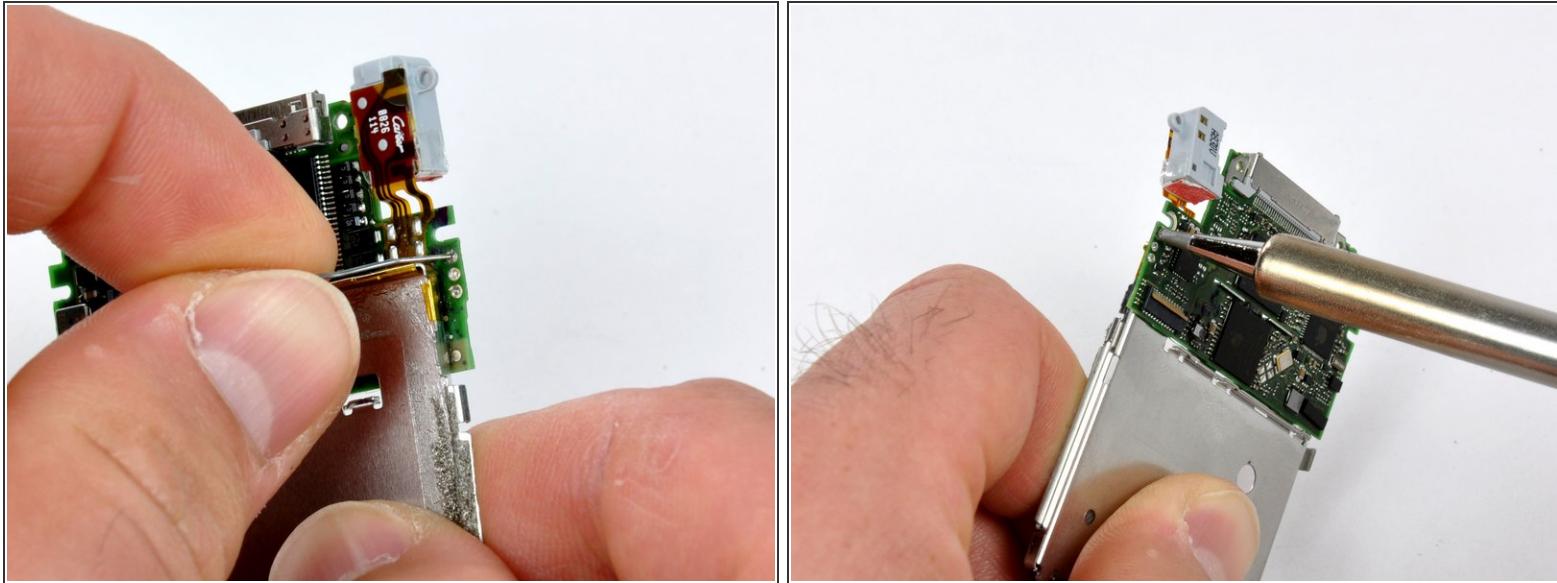


ⓘ Next we will cover a moderately difficult soldering application. In our case, we will be soldering very thin and delicate leads to a circuit board with small solder pads.

ⓘ Small electronic components, including wires, cannot dissipate heat as quickly as larger components. This makes them very susceptible to overheating. Make sure to heat the connection just long enough to melt the solder.

- The leads were removed from the solder pads by heating the joint on the top side of the board, while pulling out the leads with a pair of tweezers.

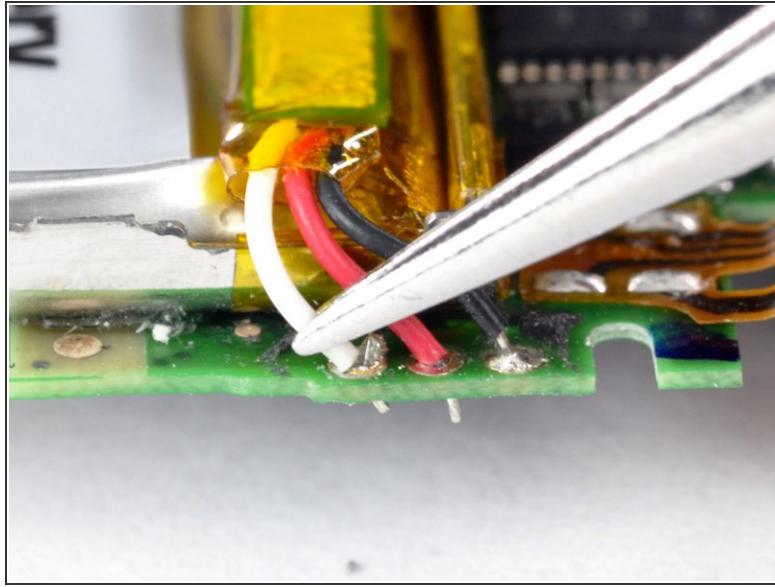
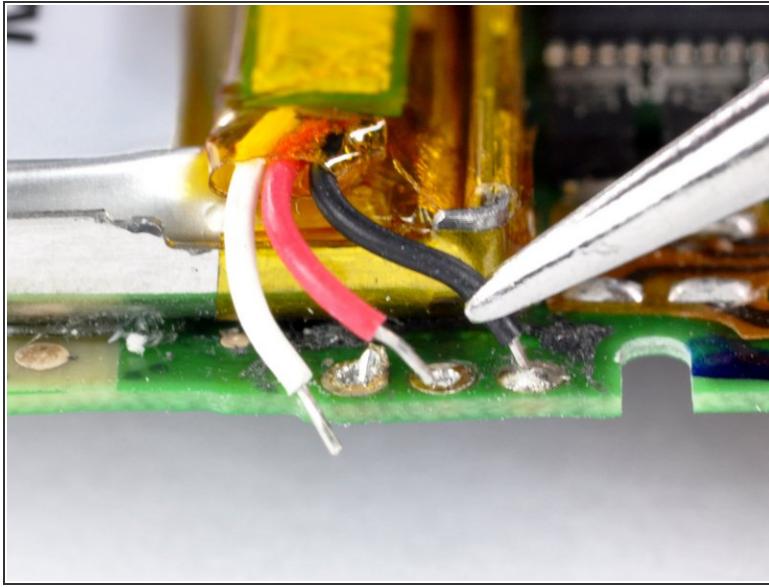
## Step 8



- ⓘ It is common for solder to cover up some of the holes through solder pads on the board. Opening these holes greatly simplifies soldering.
- Open the holes through the solder pads by pressing a straightened staple against the blockage while heating the same pad from the other side of the board.

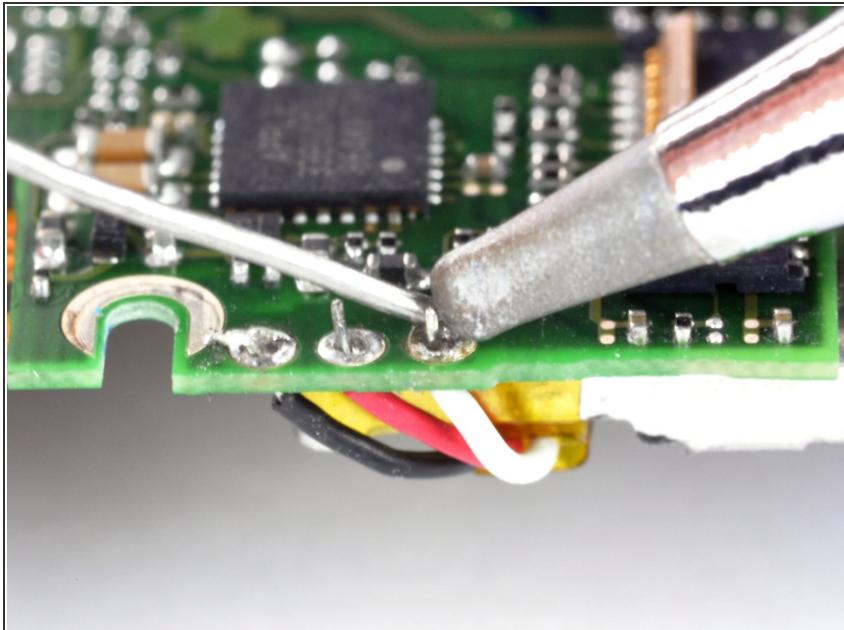
**⚠** A "[third hand](#)" tool (or a friend) can greatly help in this procedure.

## Step 9



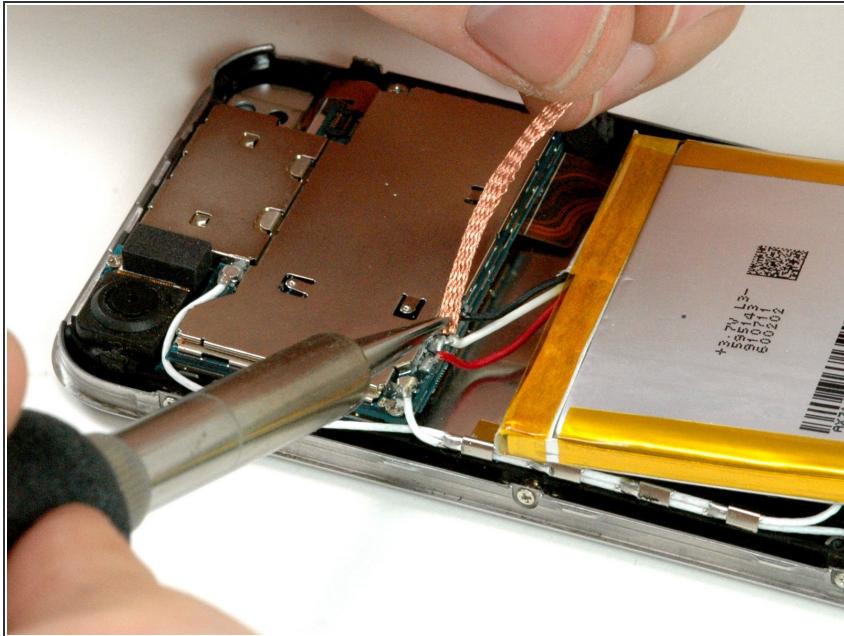
- After clearing all of the holes, insert the bare ends of the leads with a pair of tweezers.
- *(i)* To keep the leads in place, it may be helpful to first bend the battery leads into their final shape, then insert the stripped ends into the holes.

## Step 10



- To solder each connection:
  - Place the tip of the soldering iron against the solder pad.
  - Melt just enough solder onto the solder pad so that the contact leads hold firmly in place.
  - Remove both the solder and the soldering iron tip from the connection as soon as enough solder melts onto the pad.

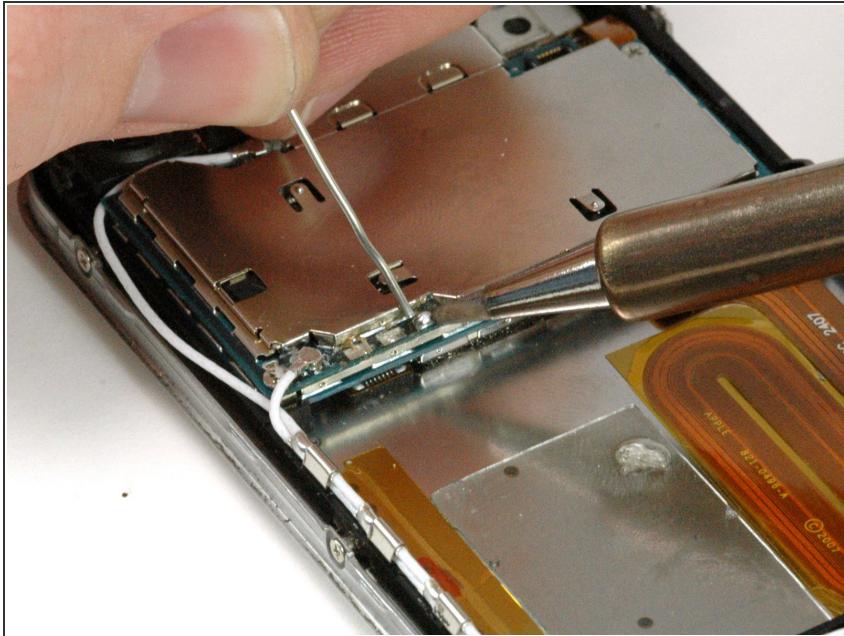
## Step 11 — Advanced Guide



- For the last section, battery leads will be soldered to surface-mount solder pads. These type of joints are harder to solder because the lead has no solid anchor point (such as a thru-hole) to hold it in place during soldering.
- To de-solder the joint, place a solder wick on top of the existing solder ball and press down on the solder wick with the soldering iron.
- Once the solder melts and flows into the wick, remove the wick from the joint.
- Repeat the same procedure on the remaining leads.

**i** When a section of solder wick is saturated with solder, it should be trimmed and discarded.

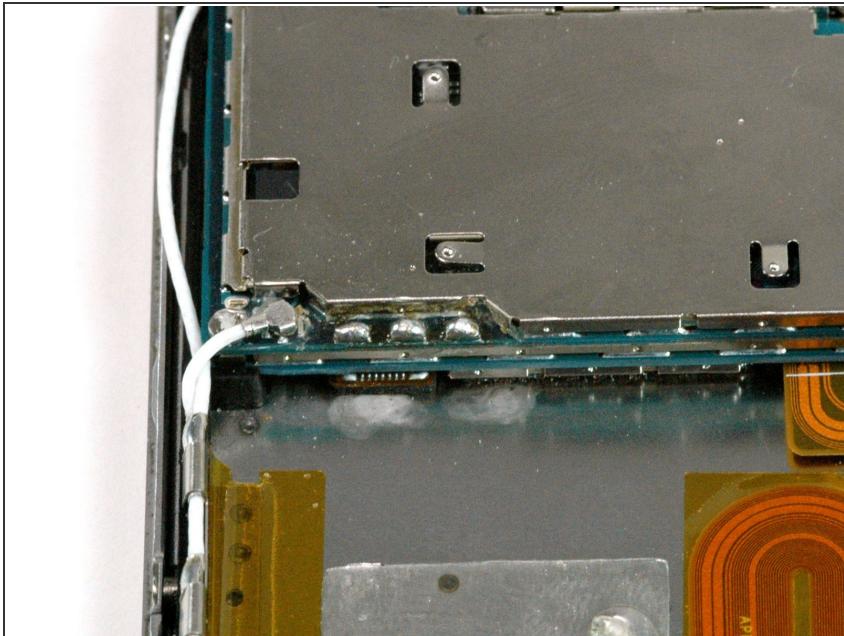
## Step 12



**i** We recommend that you clean the surface-mount solder pads with a soft cloth or sponge and a small amount of rubbing alcohol.

- To melt a small bead of solder onto each solder pad:
  - Place the tip of the soldering iron against the solder pad.
  - Melt solder so that it forms a dome on top of the pad.
  - Remove both the solder and the soldering iron tip from the solder pad as soon as enough solder melts onto the pad.

## Step 13



**i** The solder bead should look like a small dome or hemisphere. If it is flat or jagged, simply place the soldering iron back on the solder to re-melt it and then pull the soldering iron away. It may require a little more solder if this does not work.

## Step 14



- To solder the new leads to the board, place the bare end of one lead onto the bead of solder on its corresponding solder pad.
- Press the tip of the soldering iron onto the solder bead until it melts.
- Slide the exposed end of the lead into the liquid solder until it is in the center of the bead, then remove the soldering iron.
- Continue with the other connections the same way, taking special care not to solder two of the pads together.

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