



# Repairing Apple Wireless Keyboard without destroying it.

An Apple keyboard with non-functioning keys may be due to damaged traces on the two thin sheets of plastic inside, called the membrane. This is easily repairable provided you can get to it; this guide will tell you how without defacing your keyboard.

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## INTRODUCTION

I had an Apple Wireless keyboard come in with two keys non-functioning. This was due to damage from a spill.

It is very difficult to disassemble this keyboard without destroying it because there is only one screw - holding in the logic board. Everything else is glued and welded shut. But there is a way to get in and repair it so that it can be re-assembled with no signs on the outside.



### TOOLS:

- [Conductive silver paint](#) (1)
  - [Drill](#) (1)
  - [2 / 3 mm HSS Drill Bit](#) (1)
  - [Domestic oven](#) (1)
  - [Superglue](#) (1)
  - [Multimeter with continuity test](#) (1)
  - [Small Phillips Screwdriver](#) (1)
  - [Spudger](#) (1)
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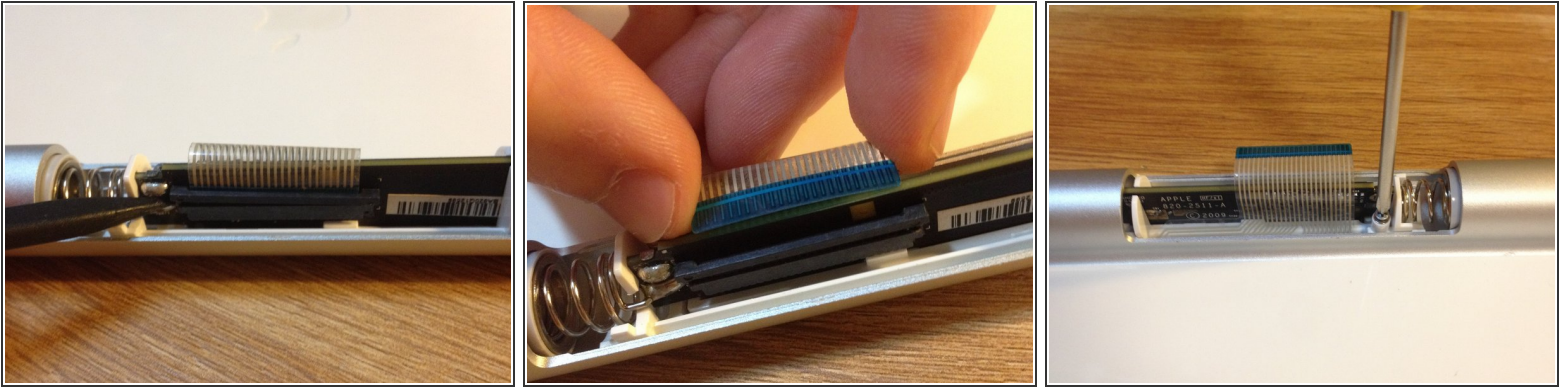
## Step 1 — The Easy Bit - Opening the covers.



- Start by unscrewing the battery compartment cap on the LHS of the keyboard and removing the two AA cells.
- Next, turn the keyboard upside-down and locate the grey plastic cover. Apply firm inward squeezing pressure to the cover and lift it off away from the keyboard.
- The cover is held in place by six clips, so you may need to use a plastic prying tool to coax it off.
- You will also need to remove the keys. Every single one. And their clips. Go slow, and don't pull at the keys. Use your prying tool to unsnap them from their clips.



## Step 2 — Detaching the Logic Board



- Using a prying tool, or fingernails if you prefer, carefully lift up the locking bar, releasing the ribbon cable from it's connector on the logic board.
- The ribbon is quite delicate, so if you encounter resistance while disconnecting it, stop and make sure the connector is unlocked. Don't pull sideways or diagonally as you may tear the ribbon.
- Now locate the one and only screw in this keyboard. Treating it with the utmost respect, carefully unscrew it and set it aside - savouring the moment - because later on you'll wish there were more of them.

### Step 3 — Removing the Logic Board



- With care, rotate the logic board assembly anti-clockwise (looking at the power button) until the circuit board is  $\sim 90^\circ$  from its starting position and now facing up.
- Slide the assembly out of the keyboard through the end with the power button. If you encounter resistance try rotating the board slightly more or less until it slides out with ease.
- Take care to hold the delicate ribbon cable out of the way while doing this to avoid accidentally tearing it.

### Step 4 — Preparing to tear-down.



- This is the point of no return. If you are not sure you want to continue, this is your last chance. Everything up until now can be undone with ease.
- Put your keyboard in the oven at  $100-150^\circ\text{C}$  and bake until golden brown. (To clarify, do not leave it in that long!). Allow the entire keyboard to reach temperature and idle there for about 5 minutes, then remove it from the oven. Careful, it's hot!

## Step 5 — The Hard Bit - Removing the bottom cover.



- Do not rush this next step. Using a prying tool, gently ease an edge of the plastic cover up. You may need a razor blade to get this started as there's not much clearance.
- Now, use the prying tool to separate the cover from the now softened adhesive holding it down. Do not be tempted to pull or bend it, this plastic cover is very thin ABS and will distort.



## Step 6 — This is worse than the glue.



- We all know Apple is fond of glue, but now you have spot welds to deal with! Underneath the cover is an adhesive coated aluminium plate, welded to the aluminium body in no less than 100 separate locations.
- This is where your drill comes in. Drill out each and every weld, being careful not to drill too deep or damage the externally visible edges.
- Your drill holes should not be deep enough to have straight sides, so they shouldn't really be holes at all. Just a countersinking depth will do.

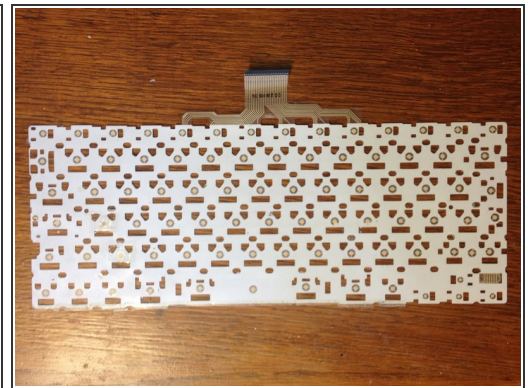
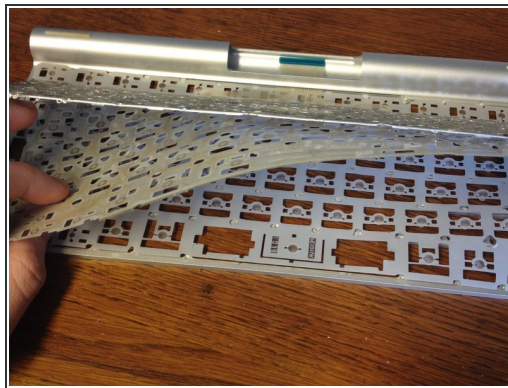
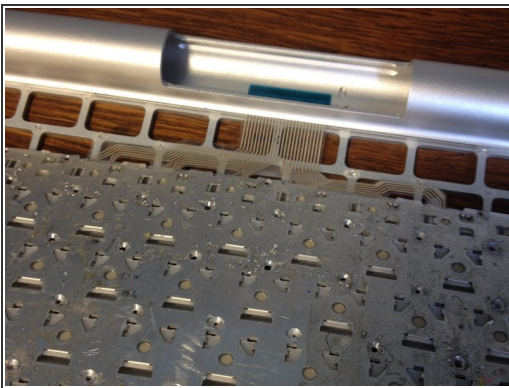


## Step 7 — Removing the aluminium 'foil' plate.



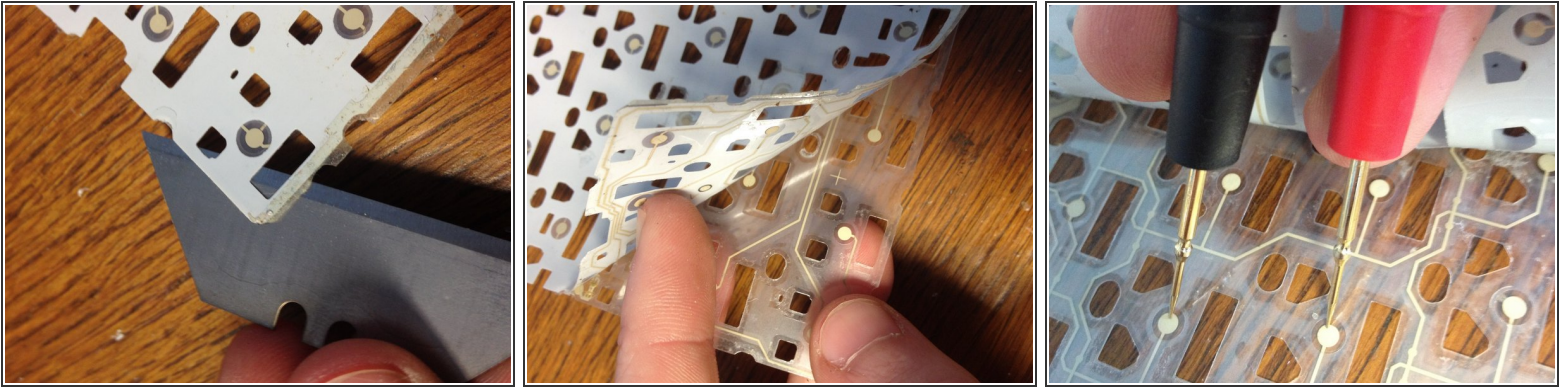
- Make certain you have drilled out every weld, then begin to pry the edges of the plate up. It is extremely thin and you will not be able to remove it without bending it slightly. Don't worry, that can be fixed later.
- If you encounter a weld that is still stuck, stop, and re-drill it. Again don't rush or be tempted to pull and bend the plate.

## Step 8 — Removing the damaged membrane



- Finally, we're in!
- Now you've removed the metal plate, you'll be presented with the membrane we need to repair.
- The ribbon cable from earlier is a part of it, and it needs to be fished through it's tiny slot before you can remove the membrane. There may be a little glue holding the membrane down, in which case pull up slowly at a shallow angle to release it.
- Underneath the membrane it is a sheet with tactile domes serving to press the pads on the membrane together. This sheet can stay here as it's of no concern to us.

## Step 9 — Locating the fault



- The membrane is composed of two thin layers of plastic that are - guess what...glued together. They are very difficult to separate and patience is key.
- Use a thin blade to separate the layers at a corner (it helps to start at the corner closest to the faulty keys) and very slowly peel the layers apart. You probably won't need to separate them all the way, just enough to expose the region of the defective key should do.
- On the inside you'll find a mess of white lines and dots. These are the conductive traces. Track down the two pads that align under the key(s) you are having problems with.
- With your multimeter, set to measure continuity, check there are no breaks in the tracks between the pad in question and it's neighbours. You can follow the lines to see which ones should be electrically connected. Some areas are coated in plastic, so you'll have to work around them.
- Try to find the exact point where the track is broken, and make a note of where it is. A page marker is great for this.



## Step 10 — Fixing the fault



- Once you've found any and all breaks in the membrane circuit, get your conductive paint and shake it well to mix the solid silver with the solvent.
- Use a thin brush or a cocktail stick to apply a small, thin layer of the paint right over the area(s) with the fault you located. If you have a dip pen this will work even better.
- Allow at least 24 hours to dry.
- If there are gaps in your newly applied paint, apply a second coat and allow another 24 hours for that to dry.
- Now check the same area with your multimeter. If it's worked, there should no longer be a fault. So grab a drink and celebrate! That's the tricky stuff over. If it hasn't worked, use your multimeter to find the exact spot where the track is still broken and add another layer of paint.



## Step 11 — Test it



- It's worth testing your repair before you go to the effort of re-assembling your keyboard.
- Lay the membrane back down in place, making sure it's the right way around, and feed the ribbon cable back through the slot into the logic board compartment.
- Follow the instructions in Step 3, 2 and 1 in reverse and re-install the logic board and batteries. You don't need to put the grey plastic cover back on.
- Connect the keyboard to a Mac computer and from the underside, gently press on each pad to check the corresponding key works.
- If you find any key that is still not working, you'll have to get back in with the multimeter and find the fault. Remember it could be on either side of the membrane and it may not be visible by eye,

## Step 12 — Closing it up



- Once you're satisfied your keyboard is now fully working, turn it off, re-install the thin metal plate and use superglue to replace the welds and hold it down. Apply firm pressure so there are no gaps.
- This will take a while, but it's worth doing properly because those welds were important! They stopped the entire keyboard from popping out when you press on a key. The superglue will suffice and with the added benefit of being easily removed if you need to re-enter the keyboard.
- If the adhesive on the back of the plate is still in fairly good condition, you should be able to stick the white plastic cover back on. If not, use a little glue.
- You can now re-install the grey plastic cover and every single key on the keyboard. To do this, apply pressure between two fingers to clip the keys back on, one on the underside. This will stop the glue from breaking.
- That's it! Test it again to make sure it works. If it does you're clear to start using it again. Just be mindful that the structure has been compromised. Smashing your fists on the keys at any time will undo your work gluing it back together.

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