



Qi Wireless Recharging Battery Case

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<https://learn.adafruit.com/qi-enabled-battery-case>

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Introduction

Usefulness of a mobile device diminishes greatly when its batteries cross the [River Styx \(\)](#); passing from the land of the living into the realm of lost socks.

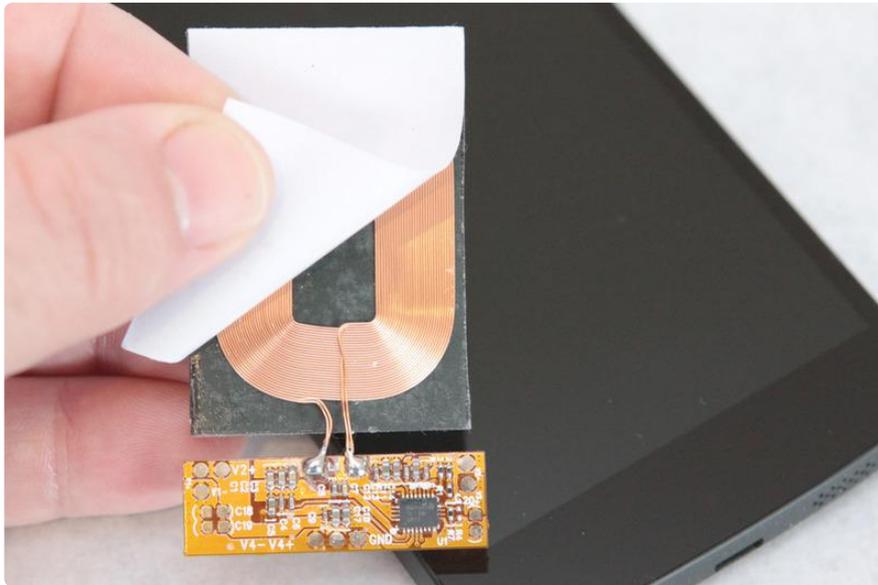


Add a battery case?

Sounds like a great idea, but you might have to give-up wireless charging (if your phone has it). Charging receivers need to be coaxially aligned and in close proximity to a power transmitter - a battery case will rain on your phones charging parade.

Here's an idea, why don't we integrate a universal Qi wireless receiver into the battery case.

Now we're talking!



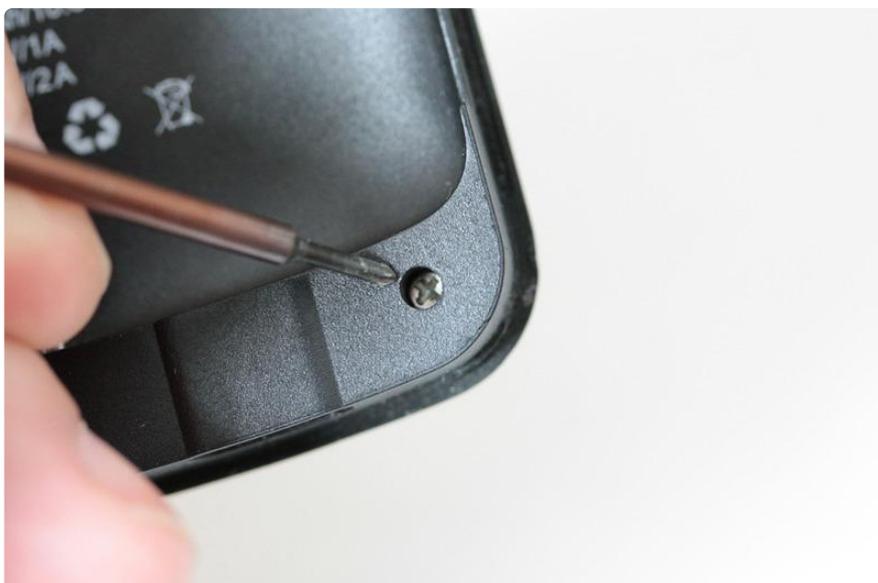
If you don't want to void your warranty or risk letting the magic smoke of out of your phone or battery case... I would recommend using the Qi charging stickers that terminate in Micro / Mini USB connectors.

For this guide, we will use the Qi Universal Charging Module and integrate it into a Nexus 5 Limefuel battery case.

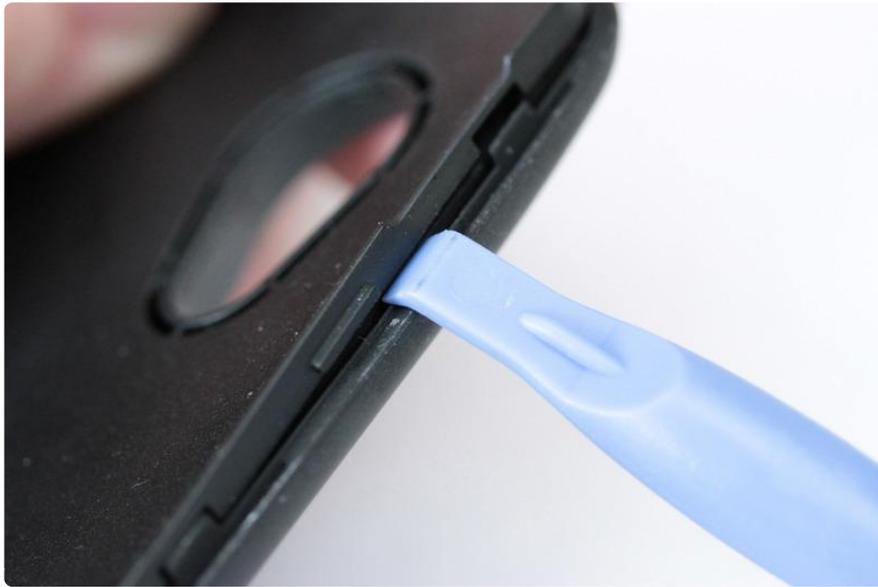
Modifying devices with high-capacity batteries can be very dangerous; please be careful!

Disassembly

Carefully examine the exterior of your battery case and remove any stickers or plugs... revealing hidden screws.



With found screws removed, it's time to use the force to open the enclosure. If the plastic is glued or welded, things may get messy.



"No Serviceable Parts" is a good heading for the picture below. Some of the pegs holding the case together were glued - barnacles!

No worries, a spot of glue during re-assembly will help the medicine go down.



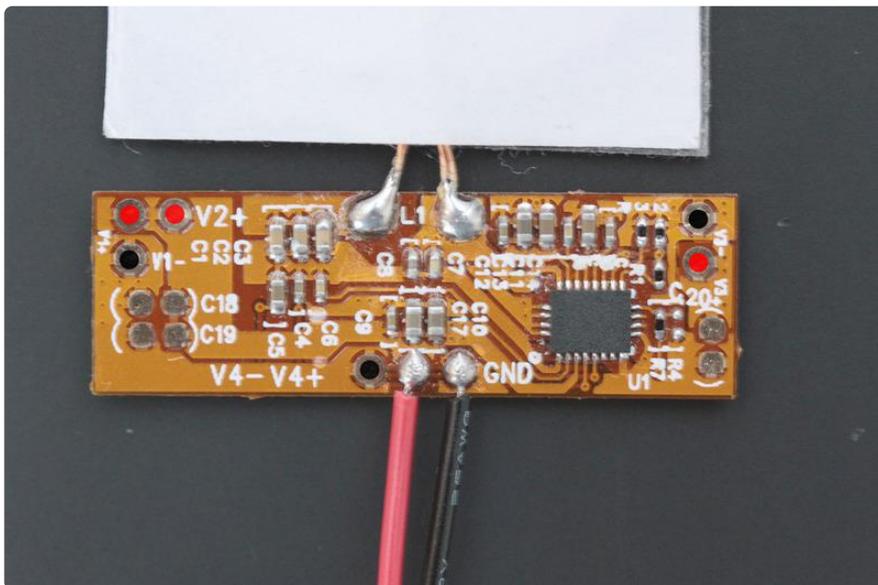
Being mindful of tolerances between parts is important. Manufacturers often set a high priority on making devices slim and smooth; this relief (below) was needed to make room for the battery.

So, be realistic... you may need to shelf the idea of integrating the charging receiver inside the case and fallback to the external sticker.

I was lucky this time, there is just enough room to squeeze-in the charging receiver

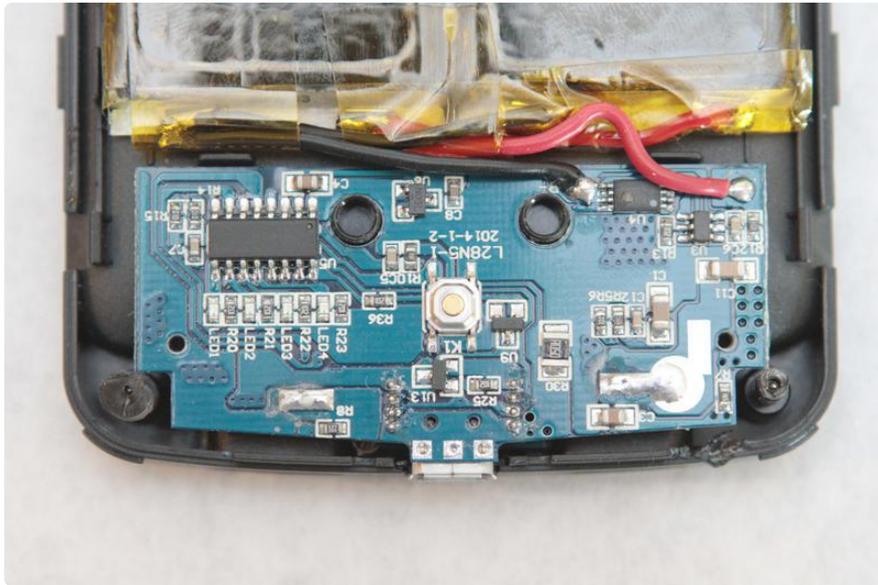


The Universal Chargers' flexible PCB has several sets of power and ground pads... use the set that works best with your battery case guts.

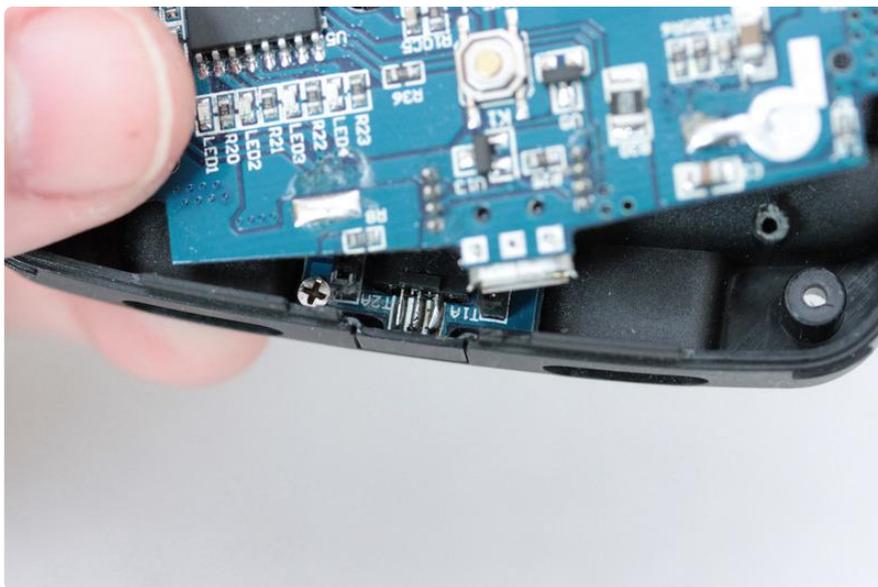


Guts!

Not much to see here, a couple batteries in parallel and a charging controller.



Dig a little deeper, and you'll see how the battery case passes power through to the phone.



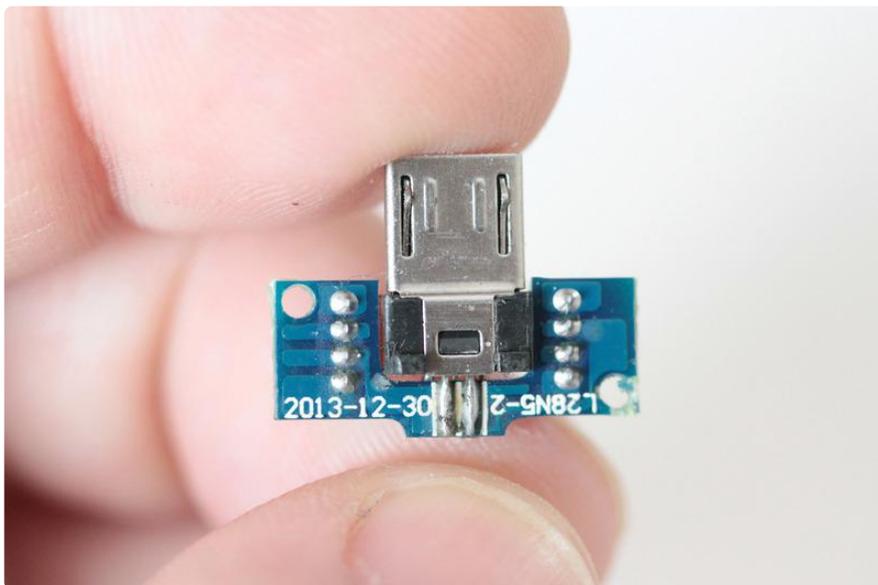
A teenie tiny riser connector flipped 180 degrees.

Isn't it cute?



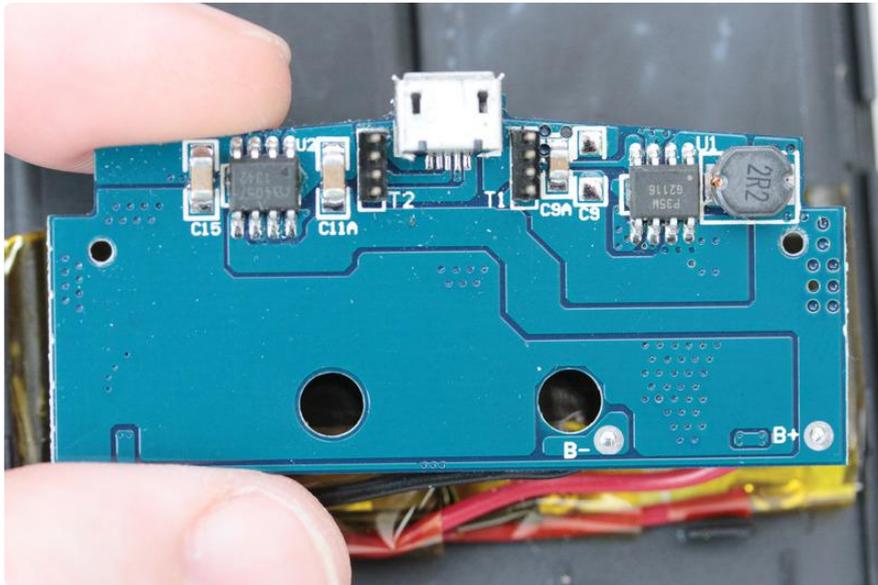
One item worth mentioning, is that this particular battery case didn't pass the OTG (On The Go) connection through to the phone for some reason.

OTG supplies power, so this might be by design.

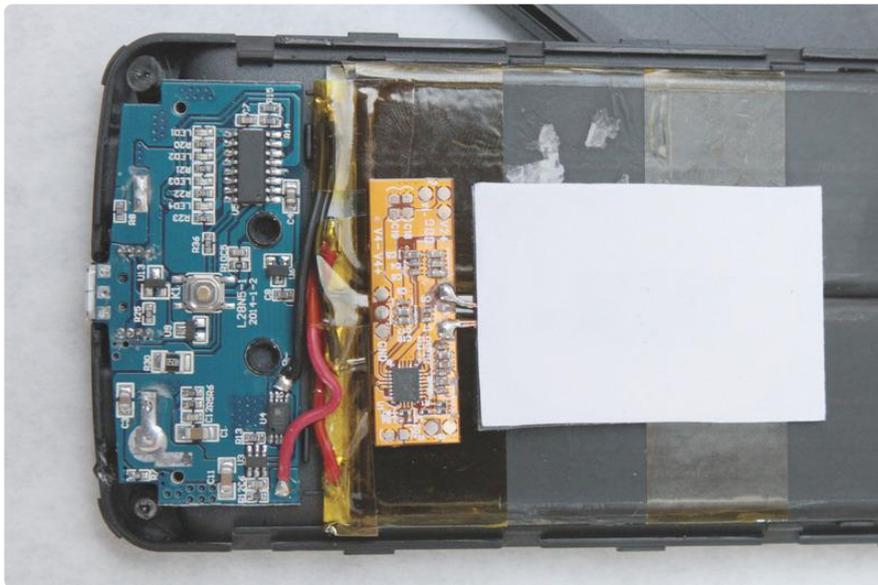


Now is the time to identify VCC and Ground via the Micro USB connector on the charging controller below... outer-left pin is Ground and outer-right pin is VCC.

Looks like VCC is connected to the pin marked T2.



Rough placement for the charging receiver... looks like we're good to go!



Insulative tape such as Kapton or electrical tape should be used to prevent short circuits.

Testing

Grab your multimeter, and let's identify the Ground and VCC pins for realz... we'll connect the charging receiver to them shortly.

Start by plugging-in your USB cable and test traces near the connector for +5 volts. It looks like T2 is indeed VCC with two ground pins on bottom.

If your multimeter reads -5 volts, flip your probes.



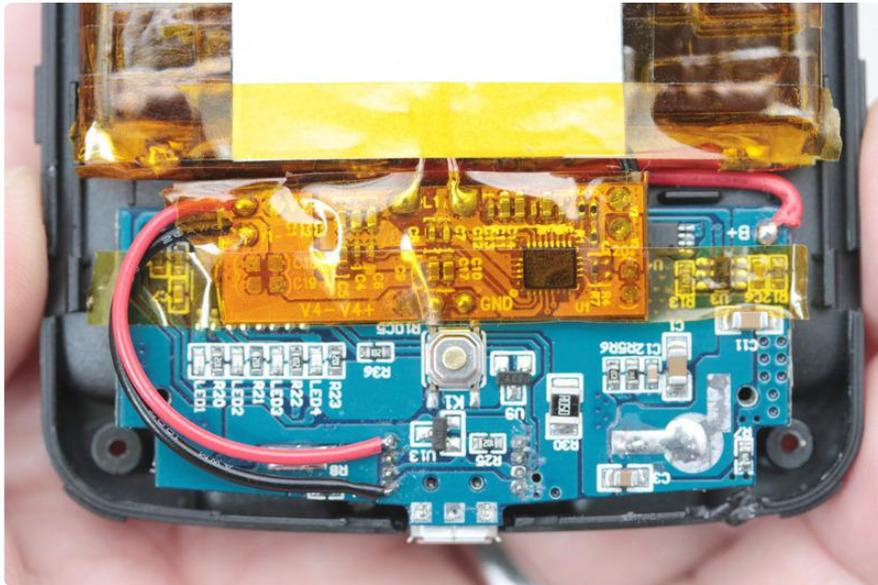
You can tape the charging receiver to the transmitter with painters tape or do like I did and use the weight of the transmitter to hold the receiver down.

Once that's secure, make sure that the receiver is getting proper voltage.

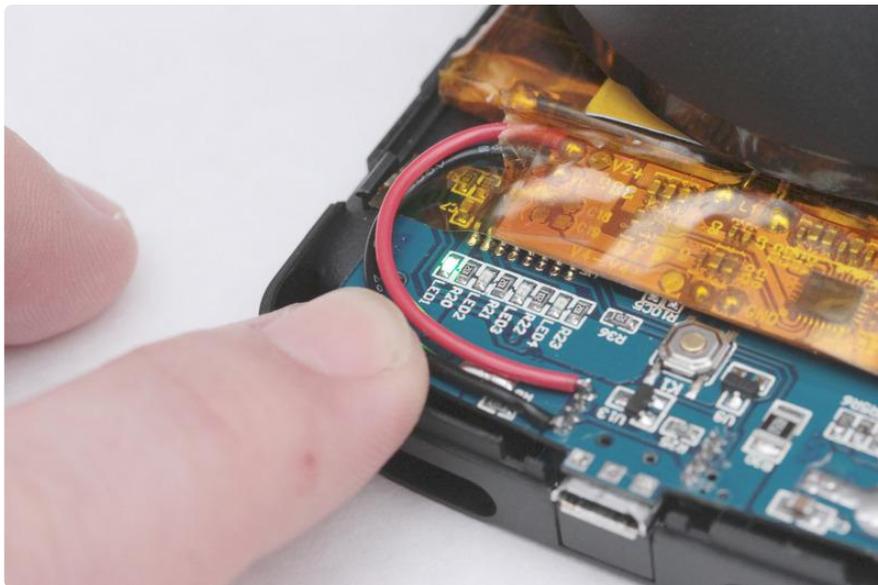


Cut a short length of red and black hook-up wire; connect the VCC and Ground from the charging receiver to the Micro USB pins we identified above.

Cover all exposed traces with insulative tape, Kapton works a treat and stands-up to wicked heat!



Make sure that your wires won't interfere with any ports, standoffs, screws, buttons, or plugs.



Re-assemble your case and slap the power transmitter on top... green means go!



I would recommend closely monitoring your phone / battery case for the first few charge cycles... just to be safe.

Batteries will get warm when re-charged, but should never be so hot that they are difficult to handle.



Enjoy!