



Generic 1A USB Car Charger Teardown

We have all seen these cheap no name chargers on ebay. They are sold by predominately overseas sellers. They seem like a good deal compared to the actual brand name chargers. Are they actually a good deal or do you get what you pay for?

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TOOLS:

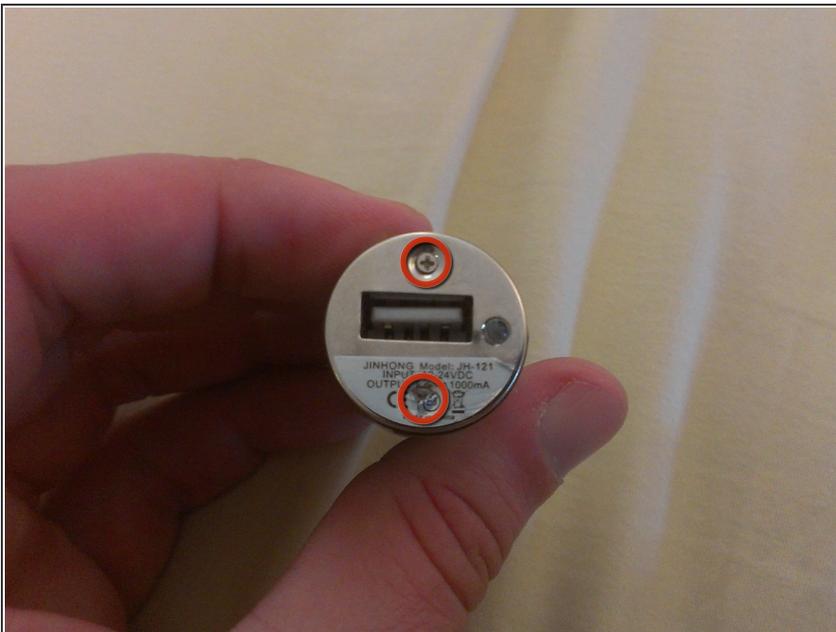
- Phillips #00 Screwdriver (1)
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Step 1 — Generic 1A USB Car Charger Teardown



- Here we see the device. It is predominately cheap plastic and thin stamped metal.
- It looks and feels very light and cheap, not a good sign. Though as they say don't judge a book by its cover.

Step 2



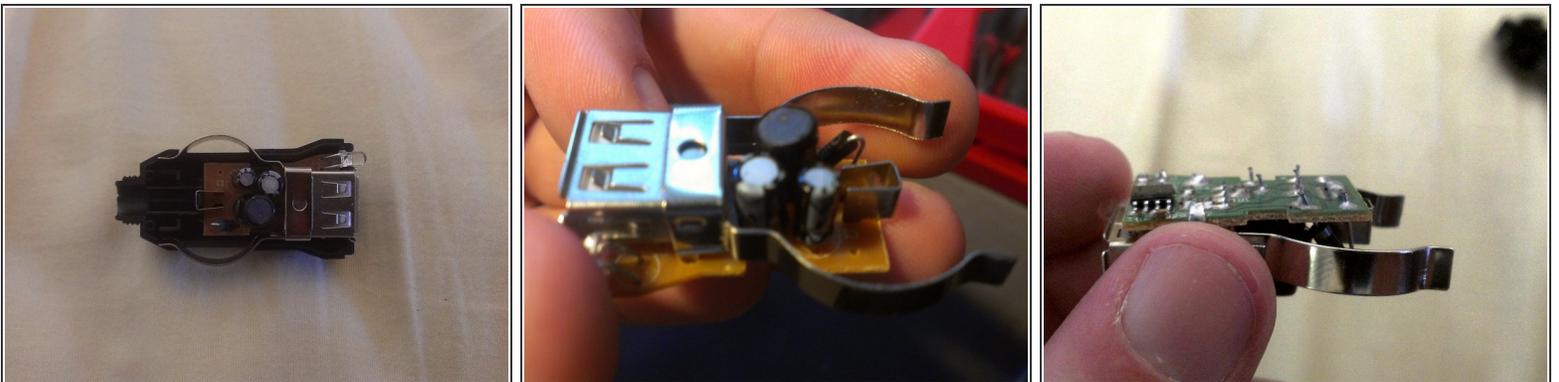
- Remove the two screws on the front with a #00 Philips screwdriver.
- One of the screws is hidden underneath the label.
- ⚠ Be careful as these screws are very small and the plastic they screw into is VERY weak. If you over tighten the screws they will strip out.
- Pry off the metal end cap. It should come off pretty easily.

Step 3



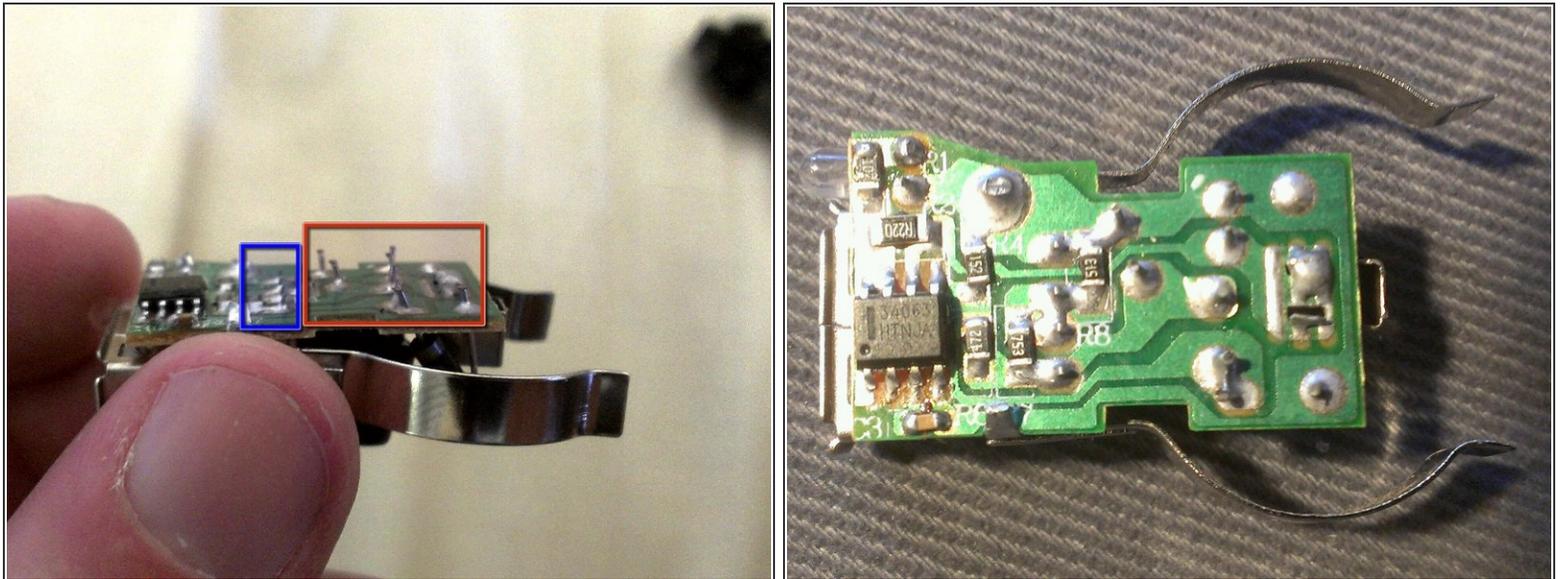
- Unscrew the metal ring at the top and remove the parts.
- Only a spring and no fuse inside. Not good at all. This means that it is relying on the fuse for the power port.

Step 4



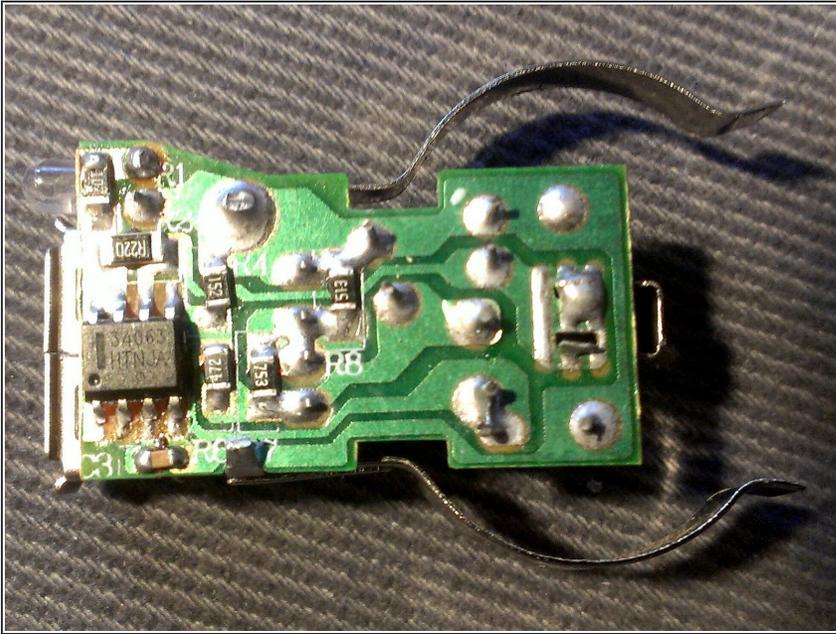
- The device the pulls apart leaving you with a VERY sparsely populated insides.
- I see two capacitors, an inductor, an LED, a usb port, a diode and the power connectors. Still no fuse or any othersemblance of protection circuitry.

Step 5



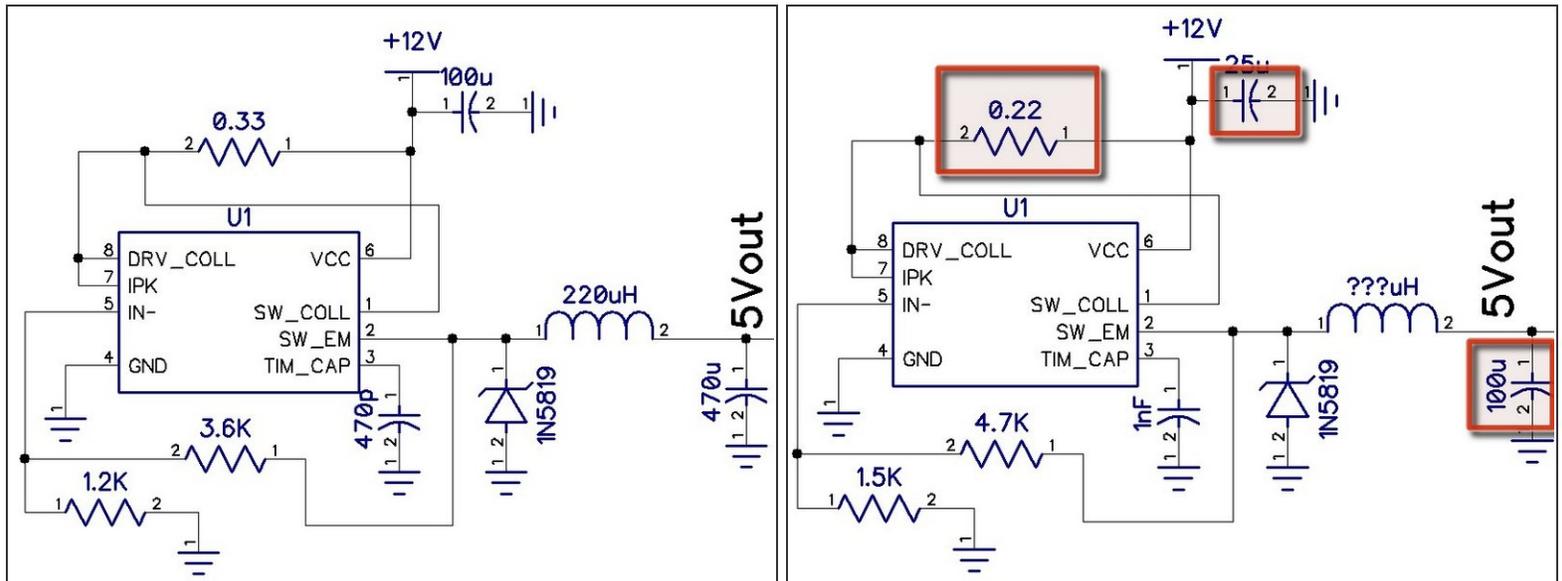
- Lets look at the other side. Holy Long Leads Bat Man! Those leads (in the red box) are WAY too long. Compare their length to the ones on the USB connector (in blue). While the soldering looks OK, the long leads show a general lack of attention to detail and cutting of costs.
- Now we get a good look at the circuit board in general. The more signs of cost cutting. The solder mask (the stuff that makes the PCB green) has huge empty spaces around the solder pads. You can clearly see the brown PCB through there. This increases the risks of short circuits etc. Once again cheap design.
- The main IC seems to be an MC34063 switching regulator. A veritable workhorse in USB chargers. While this IC can drive up to 1.5A it is only considered good for up to 700mA continuous before heat becomes an issue. Uh oh.

Step 6



- Now let's look at the schematic and see how it compares to the datasheet.

Step 7



- Here we see the stock schematic from the database.
- In the next image we see the schematic used in the device. We see many values have changed.
- The biggest change is that R_{sc} is 0.22ohms. This gives an I_{pk} of 1.36A, which gives an $I_{out Max}$ of 0.68A. This is FAR from the quoted 1A.
- Also, the input and output capacitors have been reduced in size to 10uF and 100uF respectively. This means that we will see MUCH larger ripple on the output. Possibly falling out of USB spec and putting the attached device at risk.
- Quite simply, the device is a rebadged 500mA or 750mA USB charger at best. It is NOT 1A capable, despite what the sticker on the body says.

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