

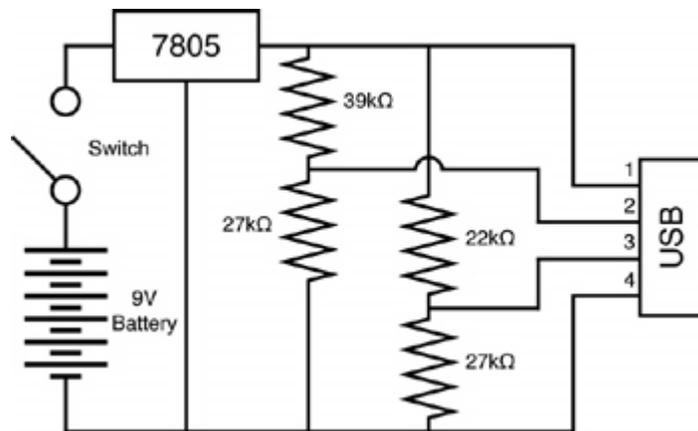
USB CHARGER KIT | JAMECO PART NO. 2155516



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Experience Level: Easy | Time Required: 30 Minutes

Has your phone or iPod ever died when you needed it the most? Design a quick mini battery charger for your electronics! Plug your device into its USB port, turn it on, and you're all set! Lots of electronics are powered from a [USB cable](#), so a powered USB port would be the most useful power source. Using a voltmeter to measure the voltage on each pin of an iPod AC Adapter, it shows +5.16V on the V+ pin, +2.06V on the D- pin, and +2.76V on the D+ pin. We'll use a 7805 voltage regulator to get +5V for V+ and two resistors for each data pin. I calculated the resistor values to minimize current loss (as not much current needs to go to each data pin). You may also calculate different resistor values if your device requires more current.



USB Charger Schematic

Kit Includes: The PCB, 7805 voltage regulator, 9V battery and battery snap, USB connector, a toggle switch, and three different resistor values.

Optional Items: The Altoids tin is not included, but some kind of enclosure is recommended. Be creative!

USB Project Assembly

Place each component on the PCB following the labels of each component:

- 1) **USB Connector U4:** This connector may have tabs on the sides. If so, you will need to clip these off in order for the USB connector to make a snug fit onto the PCB. Alternatively, you can drill holes in the PCB for the mounting tabs. Holding the PCB up to the light will show you where the wire traces are. Be sure not to drill through any traces and wear a mask when drilling through the PCB.
- 2) **Toggle switch S1:** There is only one way to insert the switch onto the PCB.
- 3) **Regulator U2:** This is polarized so be sure to insert it with the mounting tab in the same direction as the stripe on the PCB, see Figure 1.



Figure 1: Voltage Regulator Polarity

- 4) **Resistor Color Code:** R1: 39k Ω (Orange, White, Orange)
R2, R3: 27k Ω (Red, Violet, Orange)
R4: 22k Ω (Red, Red, Orange)
- 5) **Battery Snap U3:** Solder the red lead to the positive pad, and the black lead to the negative pad.
- 6) Now that all the components are soldered on the board, it's time to get your Altoids tin and cut an opening for the USB connector. You can do this by using some cutting pliers.
- 7) Fit everything into the Altoids tin and now you are ready to charge your devices anywhere you want!
- 8) It should be noted that this was designed to fit into the regular-size Altoids tin. The mini tin pictured did not use a PCB, and all wires were directly connected to each other.

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