Pokemon Potion USB Battery Pack

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https://learn.adafruit.com/pokemon-potion-usb-battery-pack

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Overview

Potion That Actually Works!

In this project we'll show you how to turn a USB battery pack into Pokemon Potion. In the Pokemon Go game, Potion is a medicine used for treating wounds. It's shaped like a spray bottle and restores your HP. If you play for a while, you know your phone's battery won't last all day, but this little DIY prop can actually revive your phone!

USB Battery Pack

This PK Cell battery pack has a capacity of 2200mAh and has a built-in charger, so you can recharge it over microUSB. It provides 5V up to 1 Amp via a USB A Port, so you can use this with any of your mobile devices.

Light It Up!

In this project, we used 7 LEDs, a slide switch and a lipo battery to make the Potion bottle light up, giving and pretty sweet effect. The 3D printed spray bottle is hollow and diffuses the light nicely (just use a light colored filament). The LEDs are connected in parallel and soldered to a custom PCB. The custom PCB was milled out of FR1 single-sided copper board on the Othermill (which is totally optional! The LEDs can be free wired, or repurposed from a flashlight or similar).

Parts

Some of the parts are optional, depending on how (or if) you want to make the LED circuit.

- USB Battery Pack - 2200mAh 5V 1A (http://adafru.it/1959)
- 7x 3mm LED (http://adafru.it/778)
- 1x 100ohm-220ohm resistor ()
- 350mAh Lipo Battery (http://adafru.it/2750)
- Slide Switch (http://adafru.it/805)
- JST-PH 2-pin SMT Connector (http://adafru.it/1769)

Tools & Supplies

- 3D Printer () & Filament (http://adafru.it/2080)
- CNC Mill (http://adafru.it/2323) & FR1 Single Sided Copper Board
- Double-sided Tape
- Soldering Iron () & Solder
- Panavise Jr. (http://adafru.it/151) / Third Helping Hands (http://adafru.it/291)

3D Printing

3D Printing

The five parts can be printed in PLA material, no support material is necessary. The parts are oriented to print as is. If you don't have access to a 3D printer, you have the option to send the files to a service like 3DHubs () to print and ship them to you.

Tolerances

The bottom cover should have a friction fit to the bottle, but they may have different tolerances depending on the 3D printer. If you find the pieces are too tight, you may need to use a filing tool on the edges to loosen up the tolerances.

potion-bottle.stl	Hollow spray bottle - USB battery pack goes in here.	Print in a light colored filament - white / natural PLA for best light diffusion.
potion-cap.stl	Cap with clip.	
potion-cover.stl	Bottom cover for the spray bottle. LEDs can be mounted here.	
potion-nozzle-base.stl	Base of the spray nozzle.	
potion-nozzle-tip.stl	TIp of the nozzle. Gets glued to the nozzle base.	

Slice Settings

Below are some recommended slice settings. We used simplify3D to slice these parts and generate the gcode. These parts were printed on a Sigma BCN3D using a .6mm nozzle and 1.75mm filament.

- .3mm layer height
- 220C extruder / 65c bed
- 20% infill
- 5 top/bottom layers
- 2 shells / parameters
- 60mm/s printing speed with 120mm/s travel
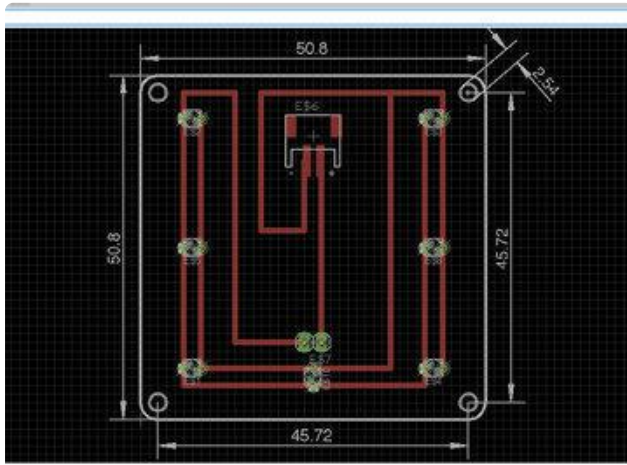- .6mm nozzle with 100% extrusion multiplier

<div align="center">

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Download STLs

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Circuit Diagram

EagleCAD

I designed a simple board in EagleCAD. The 7 LEDs are connected in parallel. A JST connector connects directly to power and ground. A slide switch goes in between the JST and first LED to act as an On/Off switch.
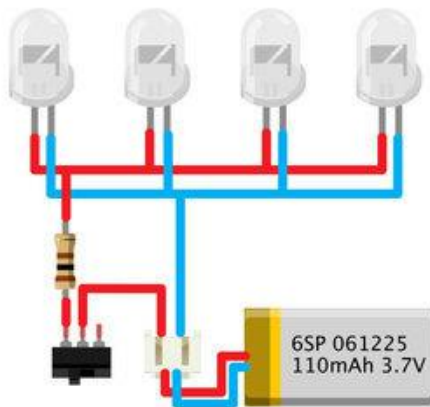
Here's a quick breakdown of the board dimension (case you're interested).

50.8mm x 50.8mm
2.54mm holes
45.72mm hole distance
If you're interested in making the board yourself, but don't have access to a CNC mill, you could send it to a PCB service such as OSHPark.com ()
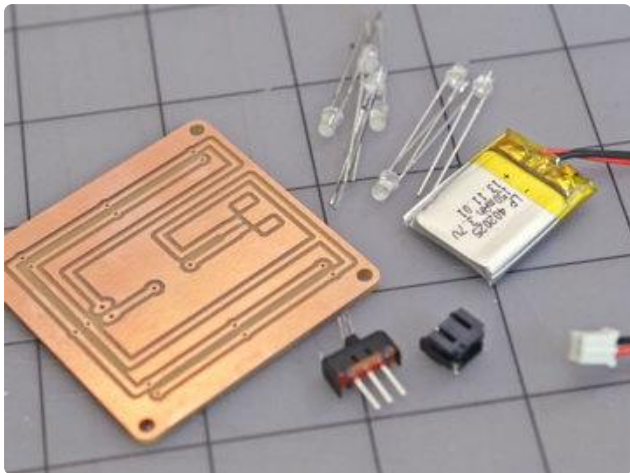
Download EagleCAD .brd

Circuit Diagram

Here's a simple diagram depicting how to connect several LEDs in parallel. If you plan on free wiring them, you'll have to plan out the best way to do so.

PCB Milling

We milled the PCB on an Othermill Pro with FR-1 single sided boards using a 1/32" flat end mill.

Circuit Components

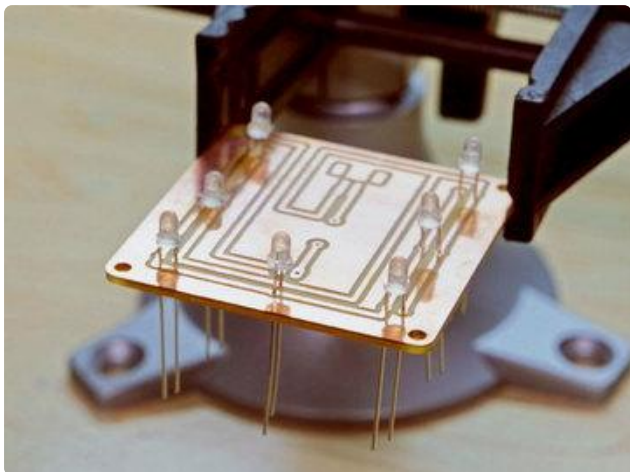We used the follow parts to assemble the circuit.

7x 3mm white LEDs (http://adafru.it/778)
1x 100-220ohm resistor ()
Slide switch (http://adafru.it/805)
JST-PH 2-Pin SMT Connector (http://adafru.it/1769)
350mAh 3.7v battery (http://adafru.it/2750)

Inserting LEDs

The LEDs are connected in parrallel with the anodes and cathodes matching their respected traces. Follow the EagleCAD drawing to see which side they go. The LEDs are not flush with PCB, exposing a short amount of legs - This makes it easier to solder them to the copper layer.
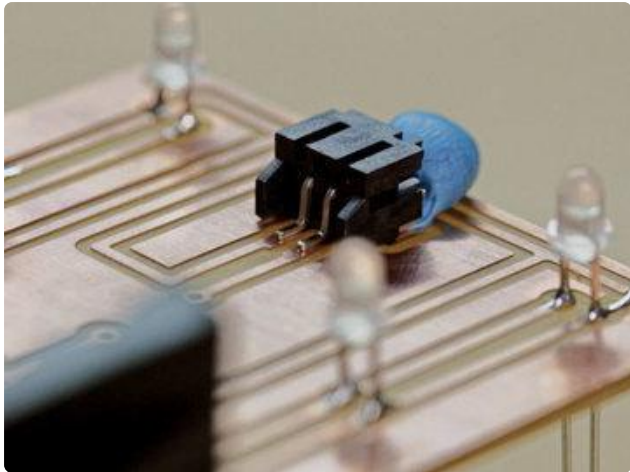
JST-PH Connector

The JST-PH 2-pin connector is a surface mounted component that's a little trickey to solder in place. A piece of tape or mounting tack can hold it in place while soldering the 2-pins.
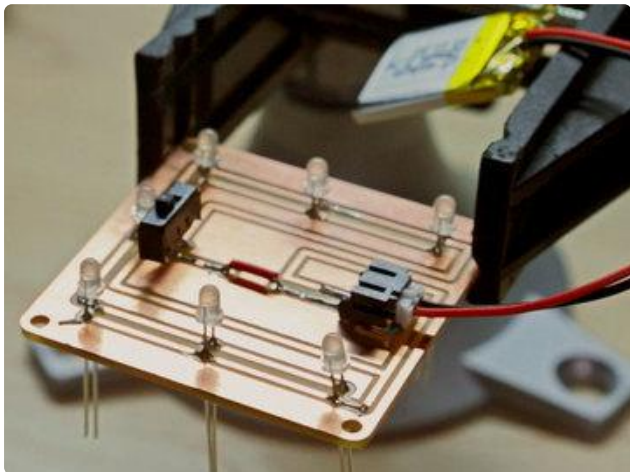
Connect Slide Switch and Battery

Remove the third leg from the slide switch and insert it to the positive/power trace with the two holes - this will allow to turn on and off the circuit. The legs from the switch are half way through the PCB - similar to the LEDs, this makes it easier to solder them to the copper layer. Once the components are secured, trim off the excess legs from the LEDs and slide switch. Test the circuit by connect the battery to the JST connector and turning the slide switch on. It's also helpful to continuity on the traces using a multi-meter.

Assembly
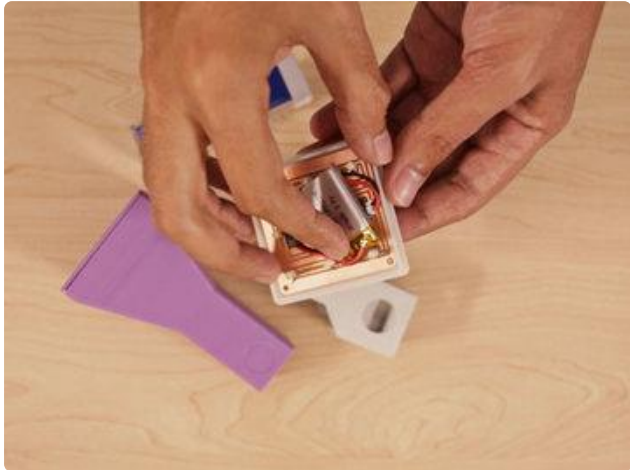
Mount PCB to Bottom Cover

Lay the PCB over the cover and line up the standoffs with the mounting holes. Insert and fasten 4x #4-40 3/8 long flat phillips machine screws.

Insert Cap onto Bottle

The cap is inserted over the top of the bottle with the recessed hole / open hole lined up. The cap should press fit and be flush with the top of the bottle.

Install Nozzle

Add some glue or mounting tack to the top of the nozzle base and press it onto the bottom of the nozzle tip. Then, glue the bottom of the nozzle base to the recessed area on the top of the spray bottle.

Install USB Battery Pack

Insert the USB battery pack into the bottom of the spray bottle and push in until the top is flush. The battery will have a hold in place with friction.

Install Bottom Cover
Turn on the LEDs and fit the bottom cover under the spray bottle.

Finished!
And that's it! Now you have a USB battery pack that looks like Pokémon Potion. Go forth, and catch some Pokémon - If your mobile device's battery gets low, just plug in and charge it up.