



Micro USB Dock for Circuit Playground

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<https://learn.adafruit.com/micro-usb-dock-for-circuit-playground>

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Overview



In this project we're building a dock for Adafruit's Dev Boards.

This simple dock lets you stand your dev board upright making it easy to display. A micro USB cable is connected to the back of the dock for charging and reprogramming.



Our 3D printed dock works with micro USB devices like the Adafruit feather and the BBC micro Bit!

This is a great way to keep your board from slipping and sliding off your desk. This simple design is great for different board shapes making it universal.



We'll use a micro usb breakout board and connector to build a custom usb extension.

You can personalize the 3D model and 3D print the dock in your favorite colors.

Parts, Tools & Components

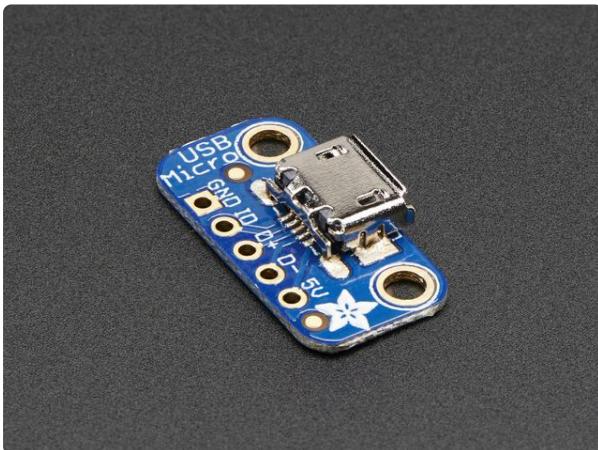
You'll need just a couple a parts to build this project. If you don't have access to a 3D printer, you can send the files to a service or check with your local hackerspace/library.



[USB DIY Connector Shell - Type Micro-B Plug](https://www.adafruit.com/product/1390)

Make your own USB connections without slicing apart a USB cable and soldering those thin wires inside. These DIY "USB shells" are available in

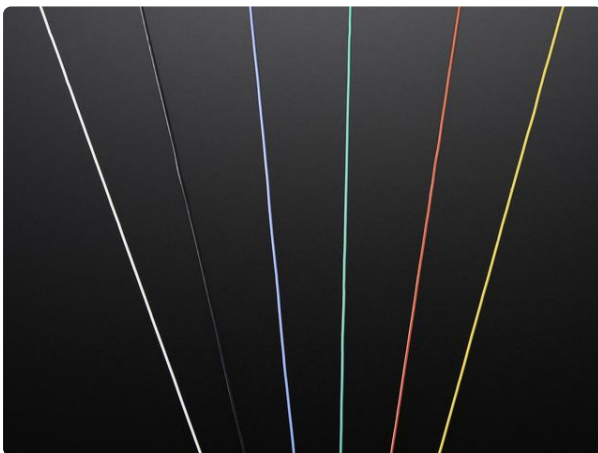
<https://www.adafruit.com/product/1390>



[USB Micro-B Breakout Board](https://www.adafruit.com/product/1833)

Simple but effective - this breakout board has a USB Micro-B connector, with all 5 pins broken out. Great for pairing with a microcontroller with USB support, or adding USB 5V power to...

<https://www.adafruit.com/product/1833>



[Silicone Cover Stranded-Core Wire - 30AWG in Various Colors](https://www.adafruit.com/product/2051)

Silicone-sheathing wire is super-flexible and soft, and its also strong! Able to handle up to 200°C and up to 600V, it will do when PVC covered wire wimps out. We like this wire...

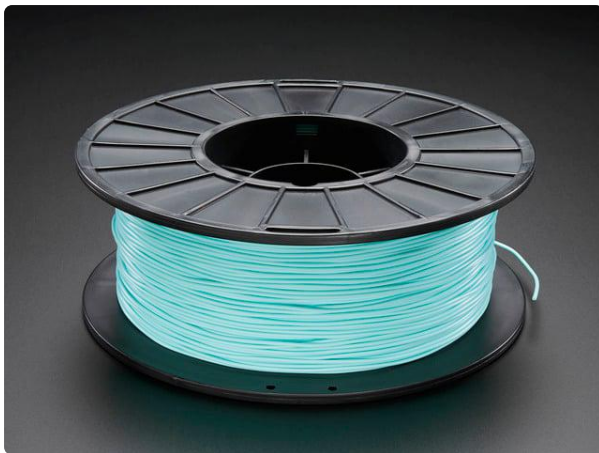
<https://www.adafruit.com/product/2051>



USB Patterned Fabric Cable - A/MicroB

Oooh it's so soft! And that beautiful pattern! If you have to have visible cables then you might as well have the nicest fabric bound cable with a eye-catching snake-like...

<https://www.adafruit.com/product/2008>



PLA Filament for 3D Printers - 1.75mm Diameter - Teal - 1KG

Having a 3D printer without filament is sort of like having a regular printer without paper or ink. And while a lot of printers come with some filament there's a good chance...

<https://www.adafruit.com/product/3069>



Ultimaker 3 - 3D Printer

The Ultimaker 3 is one of our favorite 3D printers on the market. It's a well-built open-source compact machine with an excellent UX. Every inch of the...

<https://www.adafruit.com/product/3300>

3D Printing



The 3D printed parts are fairly easy to make with most common home desktop 3D printers that are on the market.

And if you don't have access a 3D printer, you can order our parts by visiting our Thingiverse page and have someone local 3D print the parts and ship them to you.

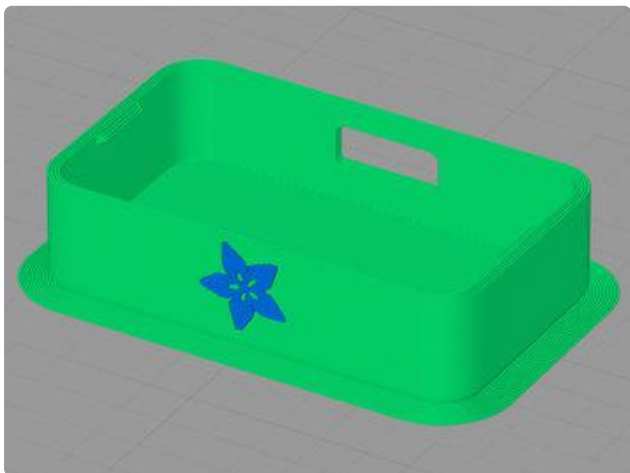
[Download Fusion360 Source](#)

[Download from Thingiverse](#)

[Download from Youmagine](#)

[Download from Pinshape](#)

Slice Settings

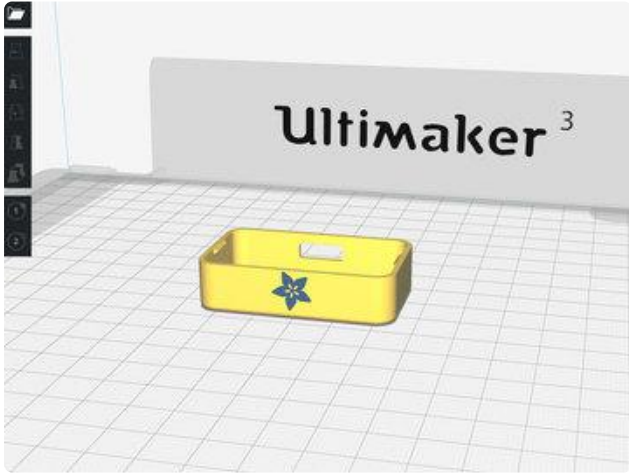


Download the STL file and import it into your 3D printing slicing software. You'll need to adjust your settings accordingly if you're using material different than PLA.

230C Extruder Temp
No heated bed (65C for heated)
1.0 Extrusion Multiplier
.4mm Nozzle
0.48 Extrusion Width
.2mm Layer Height
30% infill
No Supports
Brim
90mm/s | 120mm travel speed

Dual Colors

To print in multiple colors, we can use the separate dock parts file.



In Simplify3D, select all of the dock files and then under the edit menu, select Align Selected Model Origins. Then select Group Selection under the edit menu. Lay the lid flat with the bigger base side on the bed.

In Cura, select a part and then on the extruder(color) for each part. Now select both of the dock parts and then select merge models. Now we can rotate the merged model and lay the lid flat on the bed.

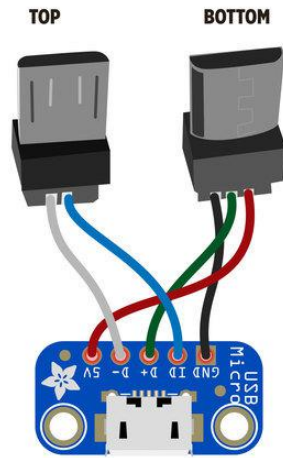
Clean up

We used a flush diagonal cutter to clean up any stringing and overhangs around the port openings and around the standoffs inside the enclosure.

Make sure the openings for the USB ports are cleaned before mounting components. Use a hobby knife to help cut away stringing that could block components from mounting.

To remove the brim, we used a deburring tool to remove the sharp edges on parts.

Circuit Diagram

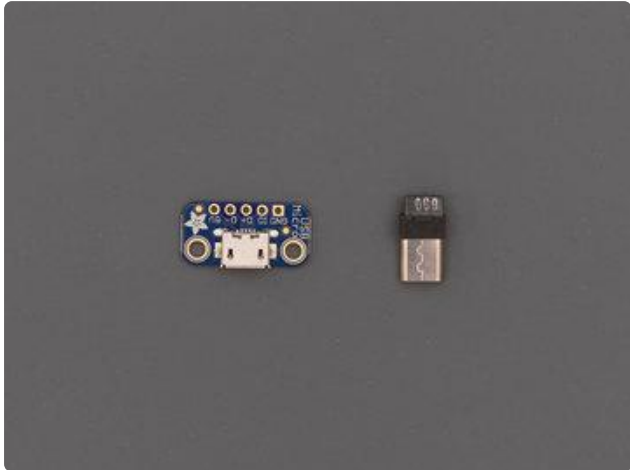


Take a moment to review the components in the circuit diagram. This illustration is meant for referencing wired connections - The length of wire, position and size of components are not exact.

The wire must be at least 70mm long in order to reach from the breakout to the USB connector. This will give enough slack to open and close the lid.

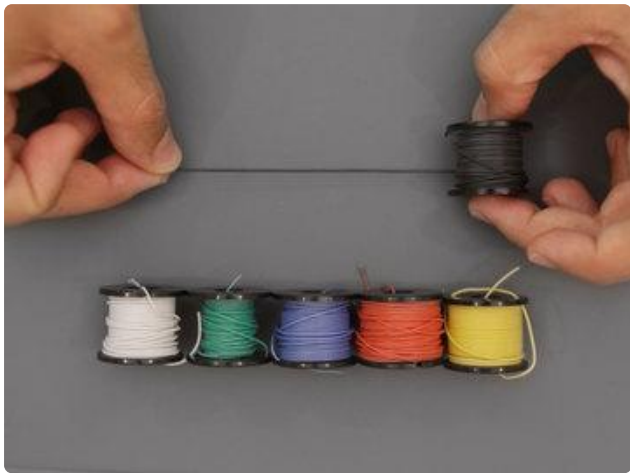
The illustration above depicts the top and bottom sides of one Micro USB connector, do not connect two USB Connectors to the breakout board!

Assemble



We'll use a Micro USB breakout board and a Micro USB connector to build a custom USB extension.

Five wired connections are needed for the usb connector and breakout. Measure wires 70mm long so we can have enough slack to reach each side of the enclosure.

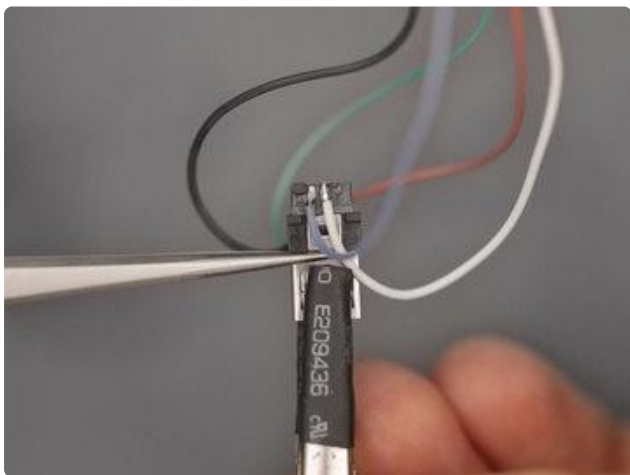


Strip and then use third helping hands to hold wires while tinning each side of the wire.

Solder the USB connector



30 gage wires are necessary for connecting to the small pads on the USB connector. Carefully tin each of the 5 pads. Make sure to double check that the solder doesn't bridge across multiple pads. You can quickly reheat the any connection with a quick swiping motion to remove any solder bridging pads.



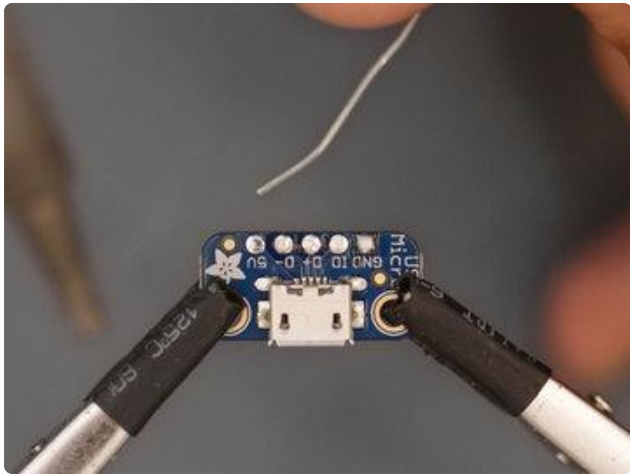
Take note that the wires are oriented away from the bottom to avoid squishing and damaging the connections once inside the dock.

A pair of tweezers are really nice for handling wires and getting into those tight spaces.



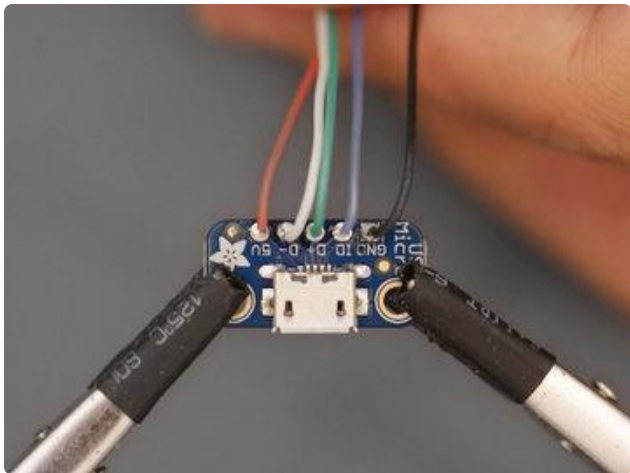
The different colored wires reference standard usb cables and help tell the connections apart. Follow the connections on the circuit diagram page to reference while soldering.

USB Breakout



Tin each pad on the USB breakout board. Double check the connections on the breakout match those on the USB connector.

Use a third helping hand to stabilize the board and match the wire colors to the pads on the breakout board.

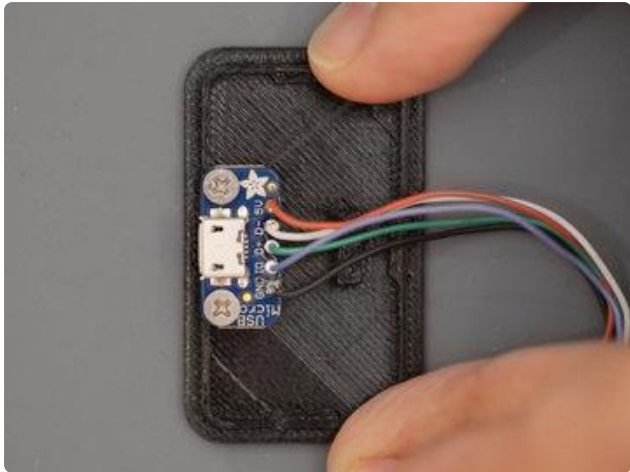


Now we can solder the wires to the breakout board. Apply heat from the bottom of the board. As the solder solidifies, push the wire through the hole.

Double check the connections to each pin match!

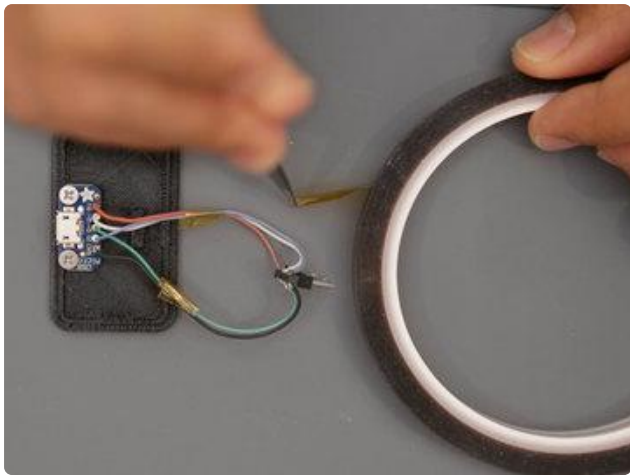


With the 3D printed case in hand ,we can start to lay out how the breakout board and USB connector will mount onto the enclosure.

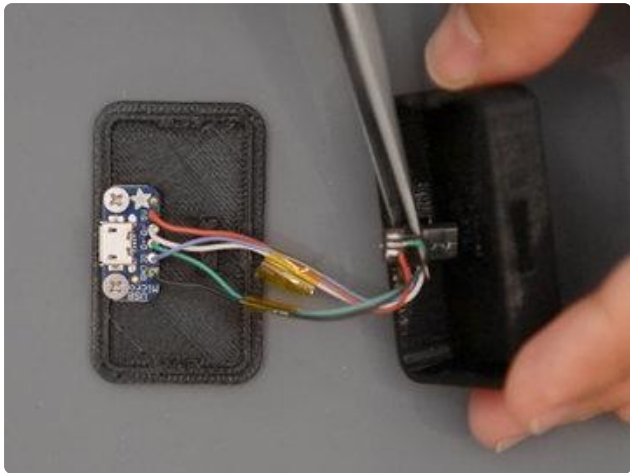


Mounting USB Breakout

First we'll secure the breakout board to the lid. We can use two M2.5x5mm long screws to fasten the board to the lid.



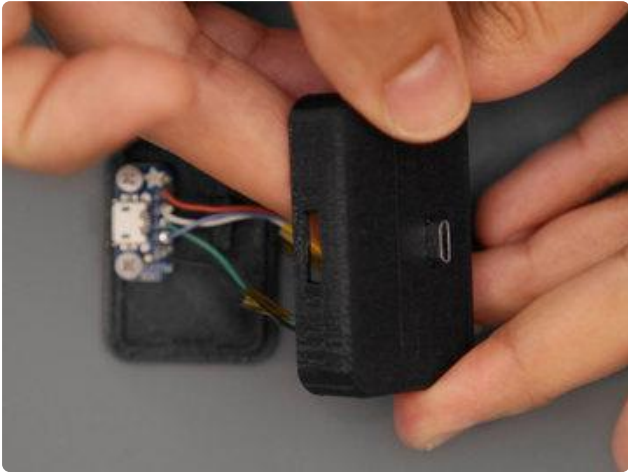
We recommend that you first tap the standoffs to make tightening the screws easier. You can create the threads by fastening each standoff with a screw and then fastening the board.



Wire management

To keep the wires tidy, we can use heat shrink tubing or strips of kapton tape to help keep the wires nicely arranged.

USB Connector



The USB connector is press fitted through the enclosure and held in place by the pillar feature on the lid. Make sure to check the orientation of the USB connector. Reference the usb port on the board you plan to dock to see how the board will mount. The Circuit Playground board mounts so the LEDs faces forward



You can always rearrange the USB connector by pushing it out and reinserting to match the board your using.

Snap lid

The cover snap fits and locks onto the dock without any screws. Angle the board to the USB port first, and then snap the rest of the lid onto the enclosure.



Complete!

Now we can plug in a micro USB cable into the back of the dock. Take note that the USB connector on the top of the dock is mounted at an angle, so carefully align boards when docking!

