DIY USB Cable Aviation Connector Retro-Fit

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https://learn.adafruit.com/aviation-connector-diy-usb-cables

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Overview

Add some locking, quick-connection points to a USB cable for fun and style! These can be useful in cases where access to USB ports is difficult or connections are delicate, but who are we kidding -- these are especially great for making your keeb or cyberdeck rig look rad!

You can also create multiple "device side" cable halves with different connectors, such as USB micro-B, USB C, and USB mini, so that you can plug in a variety of devices without needing to unplug fragile USB plugs - just use your highly beefy YC-8 connectors!
Note: introducing a bunch of stuff in the middle of a USB cable isn't great for keeping things to USB spec, so probably don't use them on USB 3 cables, high speed external drives, or mission critical medical device etc. Best for mechanical keyboards and the like!

Parts

YC-8 Quick Release 4 Pin Connector Matching Pair
If you want the look and feel of aeronautical style quick-release connectors, this YC-8 4-pin Connector Matching Pair is an elegant and inexpensive alternative. Sure,...
https://www.adafruit.com/product/5144
Fully Reversible Pink/Purple USB A to micro B Cable - 1m long
This cable is not only super-fashionable, with a woven pink and purple Blinka-like pattern, it's also fully reversible! That's right, you will save seconds a day by...
https://www.adafruit.com/product/4111

Pink and Purple Woven USB A to USB C Cable - 1 meter long
This cable is not only super-fashionable, with a woven pink and purple Blinka-like pattern, it's also made for USB C for our modernized breakout boards, Feathers, and...
https://www.adafruit.com/product/5153

Pre-Cut Multi-Colored Heat Shrink Pack Kit - 280 pcs
Heat shrink is the duct tape of electronics which we guess makes this heat shrink the colorful and exciting duct tape they sell at craft stores. This pack contains heat...
https://www.adafruit.com/product/4559

High Temperature Polyimide Tape - 1cm wide x 33 meter roll
Polyimide Tape (sometimes referred to by the brand name Kapton Tape) is an interesting addition to your toolbox! Polyimide Tape remains stable across...
https://www.adafruit.com/product/3057
Tools

Multi-size wire stripper & cutter
We've upgraded our basic 'adjustable' wire strippers to these multi-sized wire strippers. They include: 20-30 AWG strippers, wire cutters, 'plier' tips, and a wire...
https://www.adafruit.com/product/147

You'll also need:

- Soldering iron and solder
- Scissors
- Heat source for heat shrink tubing

Wiring

Wiring Chart

There are four conductors in a USB 1.1/2.0 cable to wire up in the cable connectors:

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VCC  D-  D+  GND

Red (positive voltage)  VCC
White (negative data)  D-
Green (positive data)  D+
Black (ground)  GND
```
Connector Numbering

The aviation connectors have solder lugs with the pin numbers labeled in the plastic molding. They are pretty tiny and have the numbers spaced confusingly (why are the numbers evenly/ambiguously spaced between the pins?!), so we've created these diagrams and photos to help.

The connectors are keyed with a notch at the top to aid in orientation, as well. This is important because the connectors can only be coupled one way.
Pins Front

4 1
3 2

Pins Back (solder side)

∅ 4
∅ 3
Assembly

Cable Thickness

Getting the proper cable thickness is the key to a strong connection. The YC-8 connectors grip the cable when they are screwed down tightly.

You'll use heat shrink tubing to bulk up the woven fabric USB cable shown here and give it a better grip.
The connector housing's grip flanges can accommodate a cable thickness of 4.5mm to 5mm.

Note here how the inside diameter of the housing crimps from ~5mm down to 4.25mm when it is properly tightened.
We can see the cable's outside diameter is about 3.5mm.

One layer of the heat shrink tubing brings it to about 4.2mm.

Two layers gets us to a nearly idea 4.54mm!
Cut the Cable
First, cut your USB cable with some sharp diagonal cutters about 1/3rd of the way from the device end of the cable (the non USB A side).

Wrap some Kapton tape around the fabric to prevent it from bunching up when adding heat shrink later.

Strip away the outer sheath to expose the conductors.

Slide on the Connector
Disassemble one connector and slide the parts over the cable as shown.

Repeat for both sides.
Add Heat Shrink Tubing

Cut two lengths of 4.5/2.25 heat shrink tubing, about 40mm in length.

Slide one piece over the cable and heat it, then repeat with the second piece.

This will give us the diameter needed for the cable assembly to tighten down properly.
Strip Conductor Wires
Strip about 1mm of insulation from each of the four conductor wires.
Solder the Wires

Follow the pin diagram from the Wiring page of this guide and carefully solder each conductor to the associated solder lug.

Be mindful of which connector corresponds to which housing, they are not identical.
Insulate
Use Kapton tape to insulate the soldered lugs before screwing on the housing.
Screw Together the Connector Housing

Holding the soldered connector in place so it does not twist and place strain on the soldered wiring, thread the housing on.

You may want to use small wrenches or pliers to get this on tight, which is what causes the connector to grip the heat shrink tubing and wire sheathing.
Repeat
Repeat the entire soldering process for the other cable half, and then insulate the wiring.

Holding the soldered connector in place so it does not twist and place strain on the soldered wiring, thread the housing on.

You may want to use small wrenches or pliers to get this on tight, which is what causes the connector to grip the heat shrink tubing and wire sheathing.
Connection!

You can now plug the cable halves together and use your USB cable. To separate the YC-8 connectors, retract the spring loaded collar and then pull the halves apart.