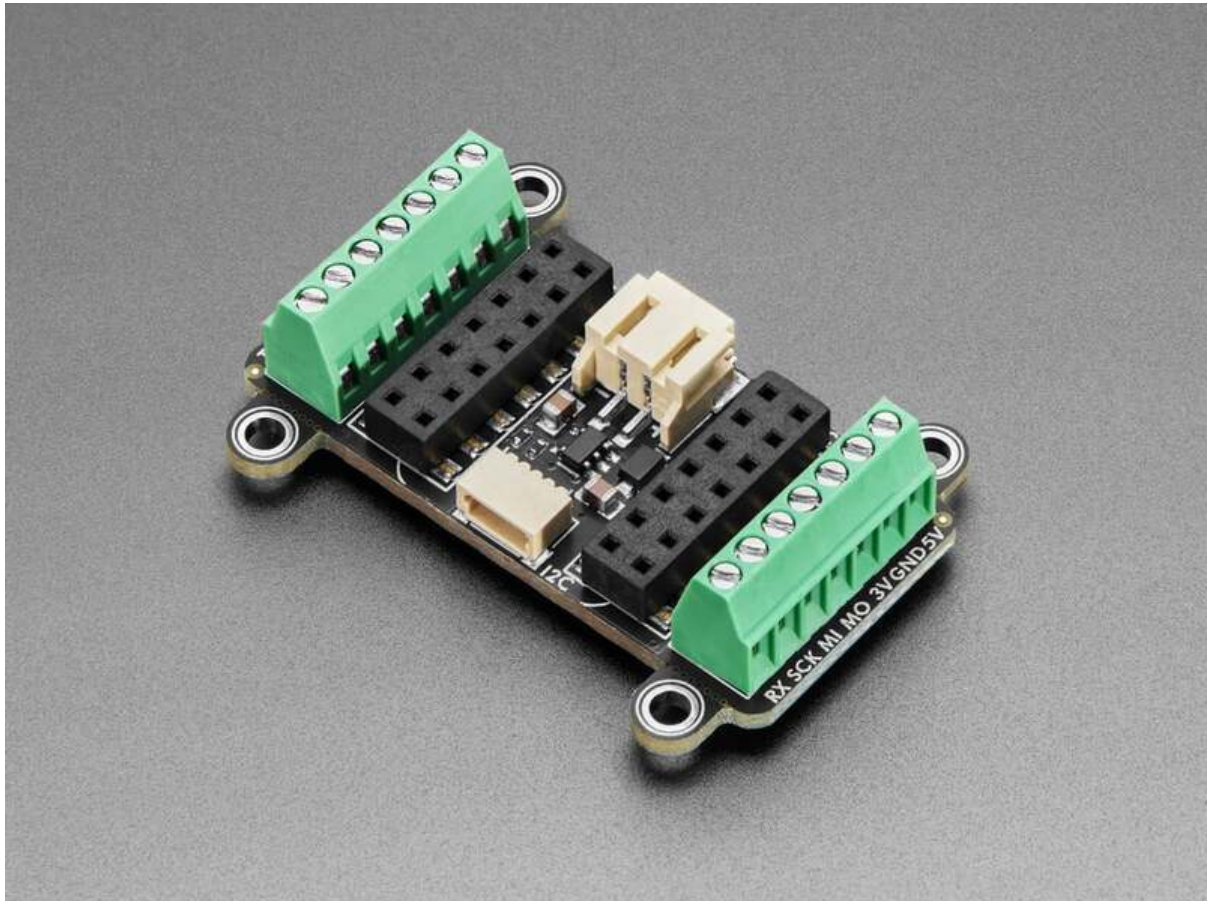




# Adafruit Terminal Block BFF

Created by Liz Clark



<https://learn.adafruit.com/adafruit-terminal-block-bff>

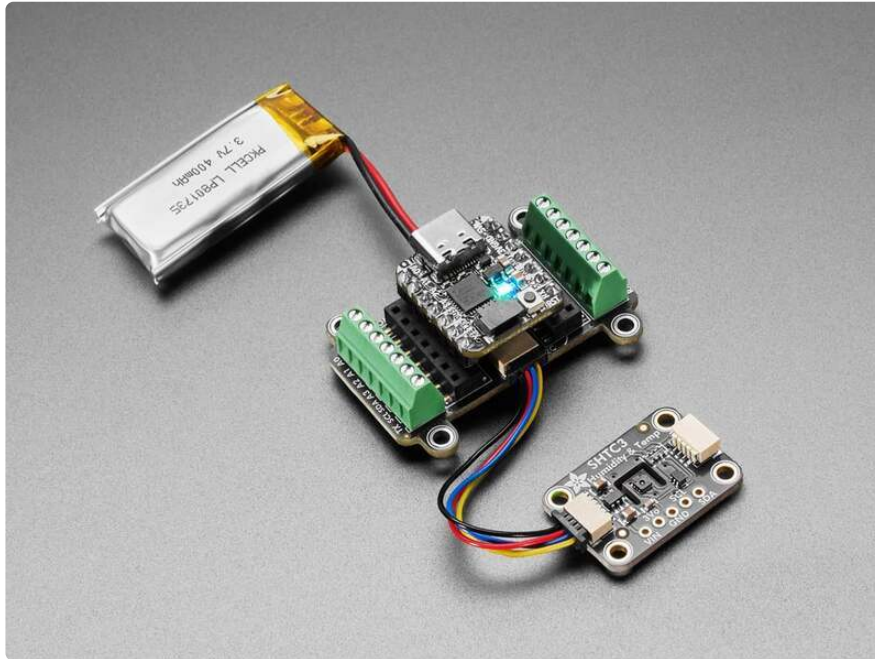
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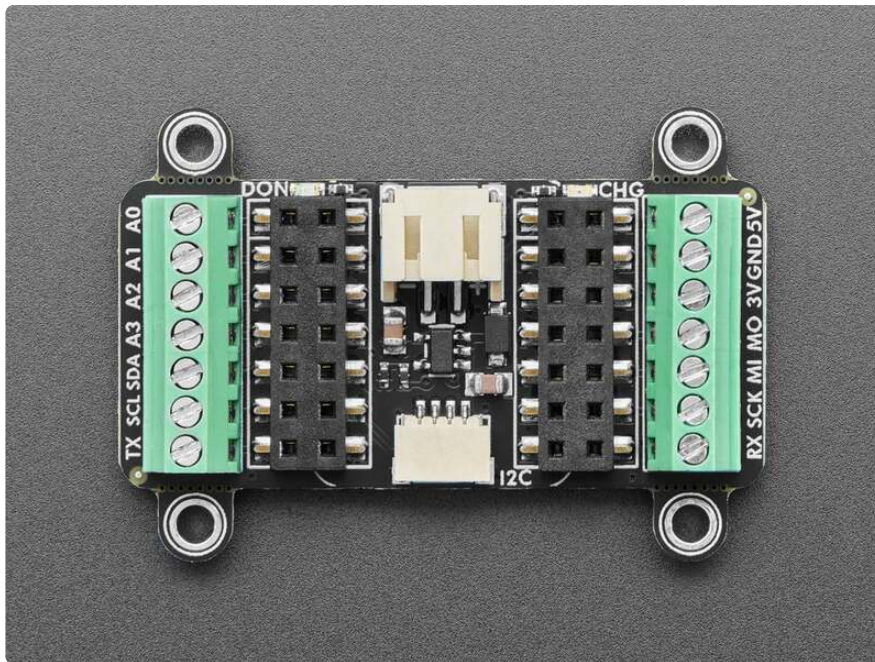
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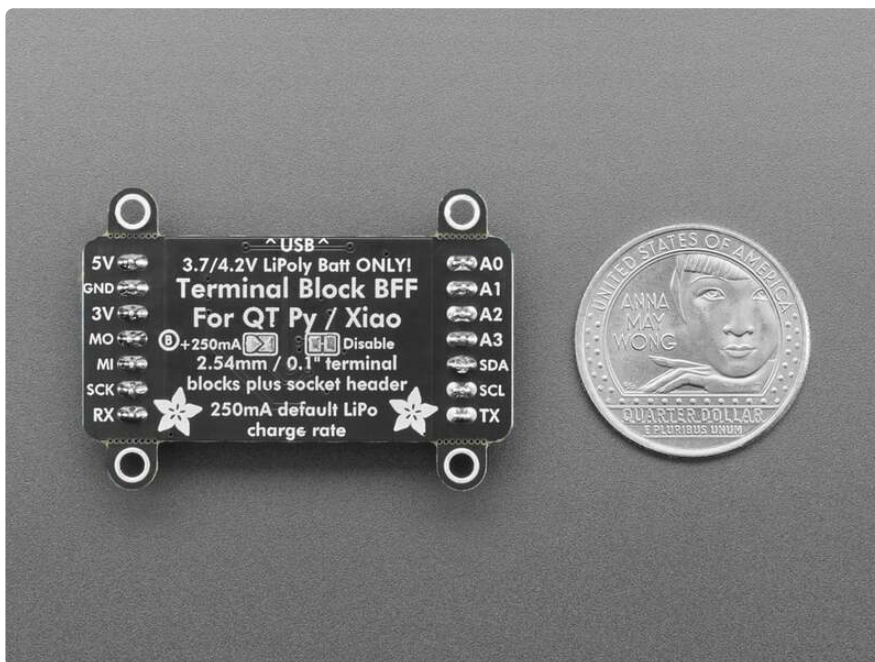
# Overview



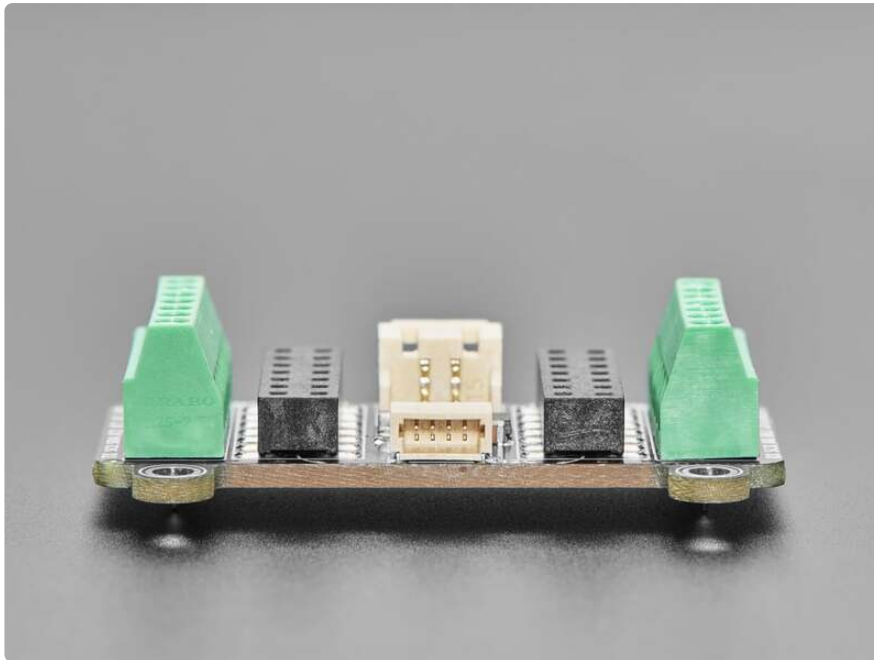
Our QT Py boards are a great way to make very small microcontroller projects that pack a ton of power - and now we have a way for you to make wiring up sensors and batteries to [QT Py boards](https://adafru.it/1ack) (https://adafru.it/1ack) even easier! The **Adafruit Terminal Block BFF Add-On for QT Py and Xiao** allows you to plug in your favvy QT Py or Xiao board and get screw-terminal blocks on each pin, plus a socket pin you can plug a wire into, as well as an extra Stemma QT port (in case your board doesn't have one) and Lipoly battery usage plus charging. Whew, it's everything you need to prototype your portable QT Py projects!



We call our line of QT Py / Xiao accessories **BFF** - a "Best Friend Forever". When you were a kid, you may have learned about the "buddy" system; well, this product is kinda like that! A board that will watch your QT Py's back and give it more capabilities.



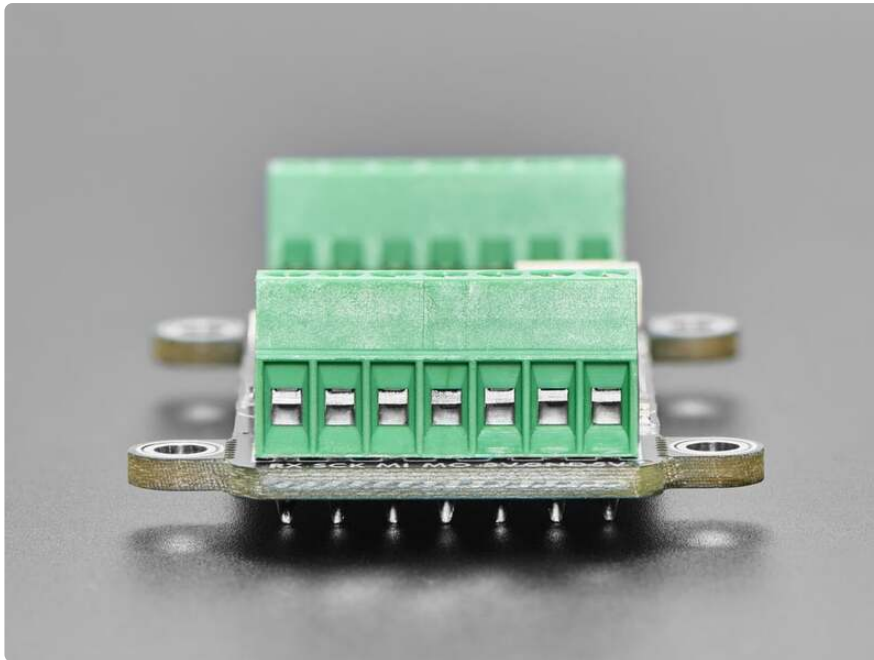
Unlike most BFF's, this one has sockets for a QT Py to plug right into. If your board has headers already soldered on, you can plug and play. If not, either solder pin headers on, or [use press-fit / solderless headers \(http://adafru.it/5938\)](http://adafru.it/5938).



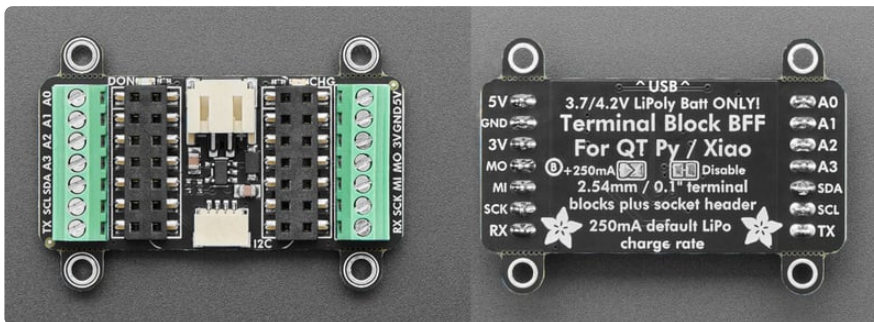
Also, no pins are 'used' by this BFF, so you can stack this with other BFFs if desired.

- [0.1" / 2.54mm pitch terminal blocks \(http://adafru.it/2140\)](http://adafru.it/2140) on every pin
- Double-wide socket header so you have a socket pin free on every pin for plugging in wires
- Four mounting tabs, they can be broken off if not needed
- Stemma QT / Qwiic (JST SH) connector on 3V / GND / SDA / SCL for connecting any of hundreds of displays, sensors, etc. No pullups are included on the BFF - but most boards have their own.
- 3.7V/4.2V LiPoly battery support with charging through the USB port. Will auto-switch to USB power when plugged in, and charge the battery with extra power. Charge rate of 250mA, can be adjusted to 500mA by soldering a back jumper
- Lipoly battery charging can also be disabled (cut back jumper) so you can use non-rechargeable batteries like AA's in a battery pack with JST PH connector.

No code required to use, so it works with any and all QT Py / Xiao boards!



## Pinouts



## Terminal Blocks

On either side of the BFF are [0.1" / 2.54mm pitch terminal blocks](http://adafru.it/2140) (<http://adafru.it/2140>). They are broken out for each pin on the plugged in QT Py or Xiao board.

## Socket Headers

On either side of the BFF are double-wide socket headers. This lets you plug in a QT Py or Xiao board and then have a socket pin free on every pin for plugging in wires.

## STEMMA QT Port

At the bottom edge of the BFF is the [STEMMA QT](https://adafru.it/Ft4) (<https://adafru.it/Ft4>) port. These connectors allow you to connect to hundreds of displays, sensors, etc. with **STEMMA**

**QT** (JST SH) connectors on 3V / GND / SDA / SCL. No pullups are included on the BFF - but most boards have their own.

The SDA and SCL pins are connected to the SDA and SCL pins on a default QT Py pinout. Note that this may differ from the STEMMA QT I2C connection on a QT Py board. For example, the [QT Py ESP32-S3 \(https://adafru.it/1aCw\)](https://adafru.it/1aCw) has its STEMMA QT I2C port on pins IO41 (SDA1) and IO40 (SCL1), but its onboard GPIO I2C pins are IO7 (SDA0) and IO6 (SCL0).

## Battery Charging

- **JST-PH** - The **battery JST-PH connector**, located at the top edge of the BFF, enables you to plug in any 3.7V/4.2V LiPoly battery to the BFF. The BFF will auto-switch to USB power when plugged in via a connected QT Py or Xiao, and charge the battery with extra power.
- **+250mA jumper** - On the back of the BFF is a jumper labeled **+250mA**. If you solder this jumper closed, the charge rate will be changed from the default 250mA rate to 500mA (default 250mA + 250mA = 500).
- **Disable jumper** - On the back of the BFF is a jumper labeled **Disable**. If you cut this jumper, LiPoly battery charging will be disabled. This will let you use non-rechargeable batteries like AA's in a battery pack with JST PH connector.

## LEDs

- **DON** - On the left side of the board, above the socket headers, is the **done** charging LED. It is a green LED. It will light up when a connected battery is fully charged.
- **CHG** - On the right side of the board, above the socket headers, is the charging status LED. It is an orange LED. It will light up when a connected battery is charging via USB.

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## Downloads

### Files

- [MCP73831/2 Datasheet \(https://adafru.it/1aCn\)](https://adafru.it/1aCn)
- [EagleCAD PCB files on GitHub \(https://adafru.it/1aCo\)](https://adafru.it/1aCo)
- [Fritzing object in the Adafruit Fritzing Library \(https://adafru.it/1aCp\)](https://adafru.it/1aCp)

# Schematic and Fab Print

