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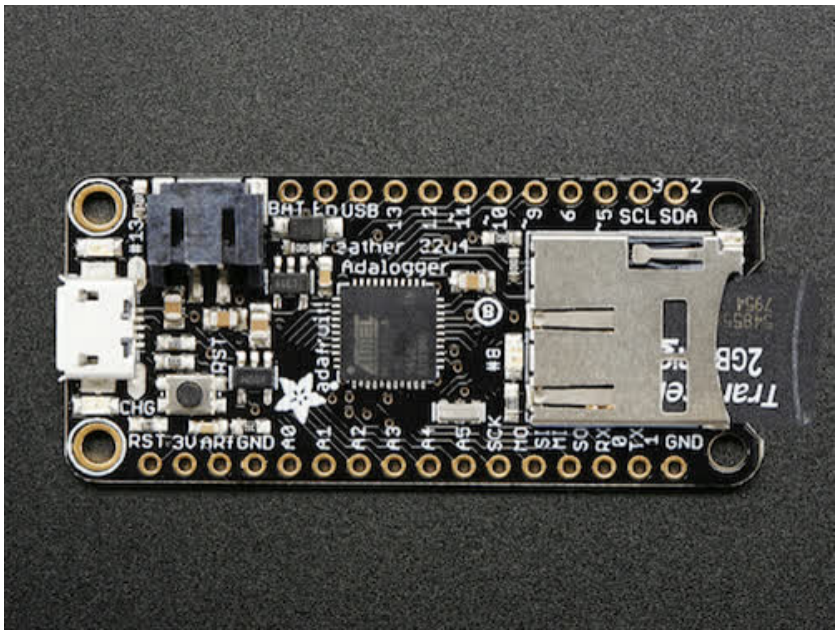
Adafruit Feather 32u4 Adalogger

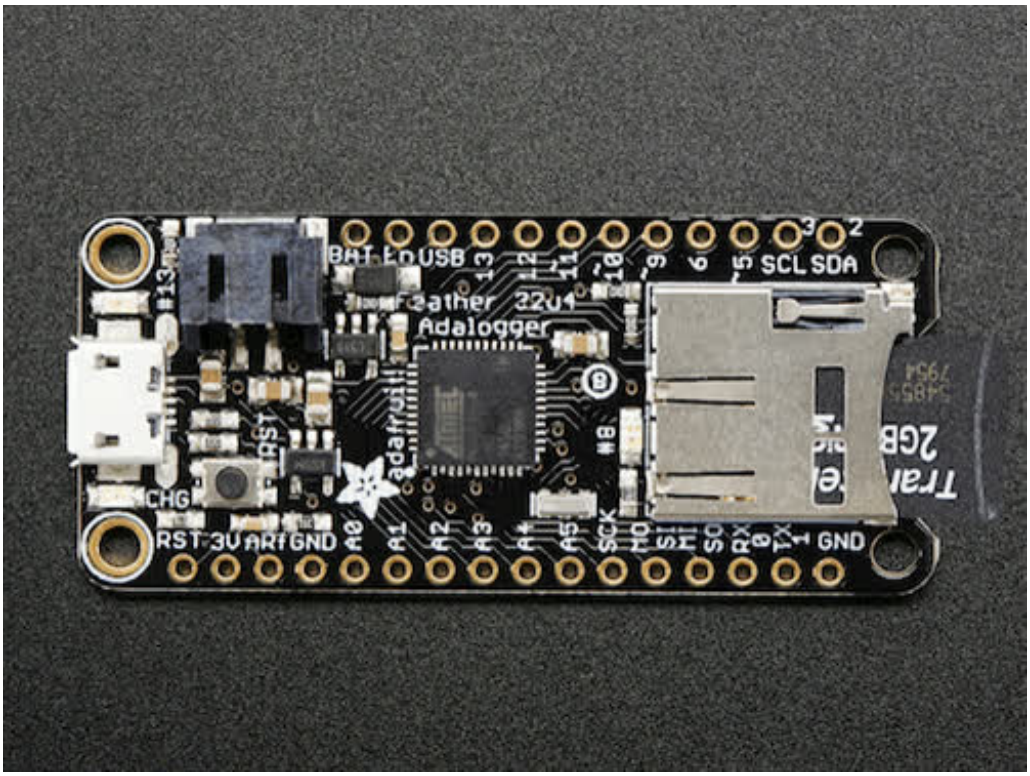
Created by lady ada



Last updated on 2017-01-15 09:52:37 PM UTC

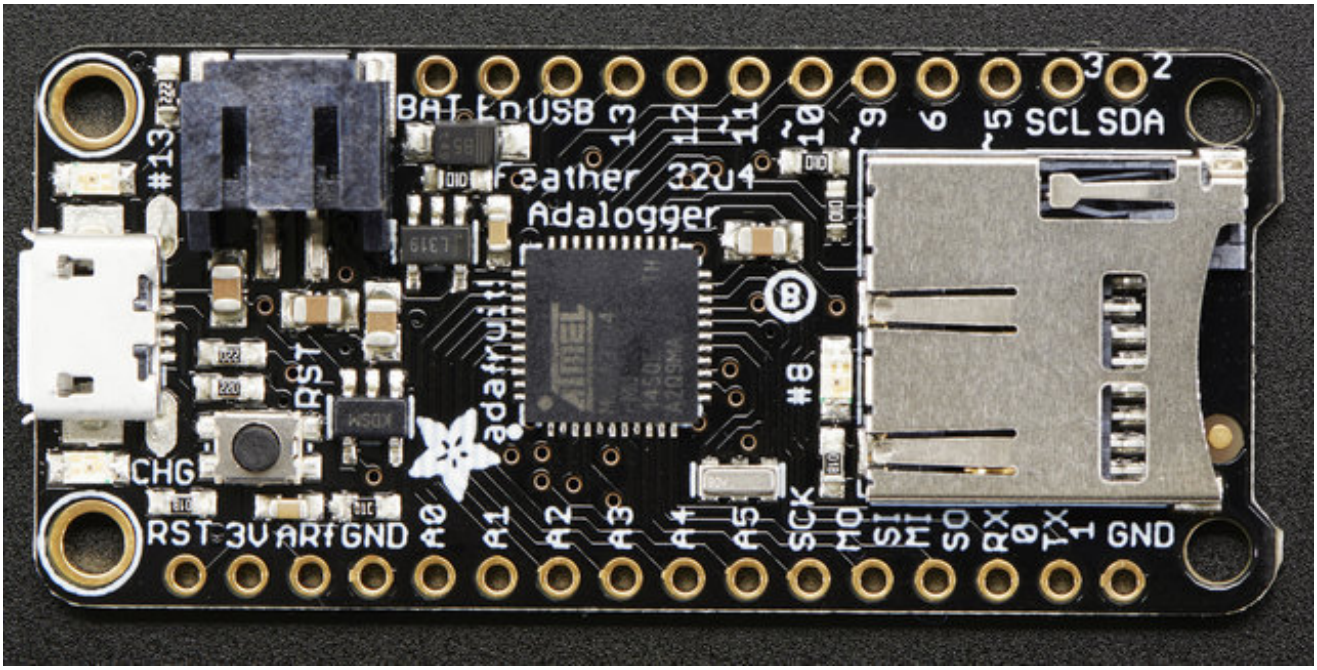
Guide Contents

Overview

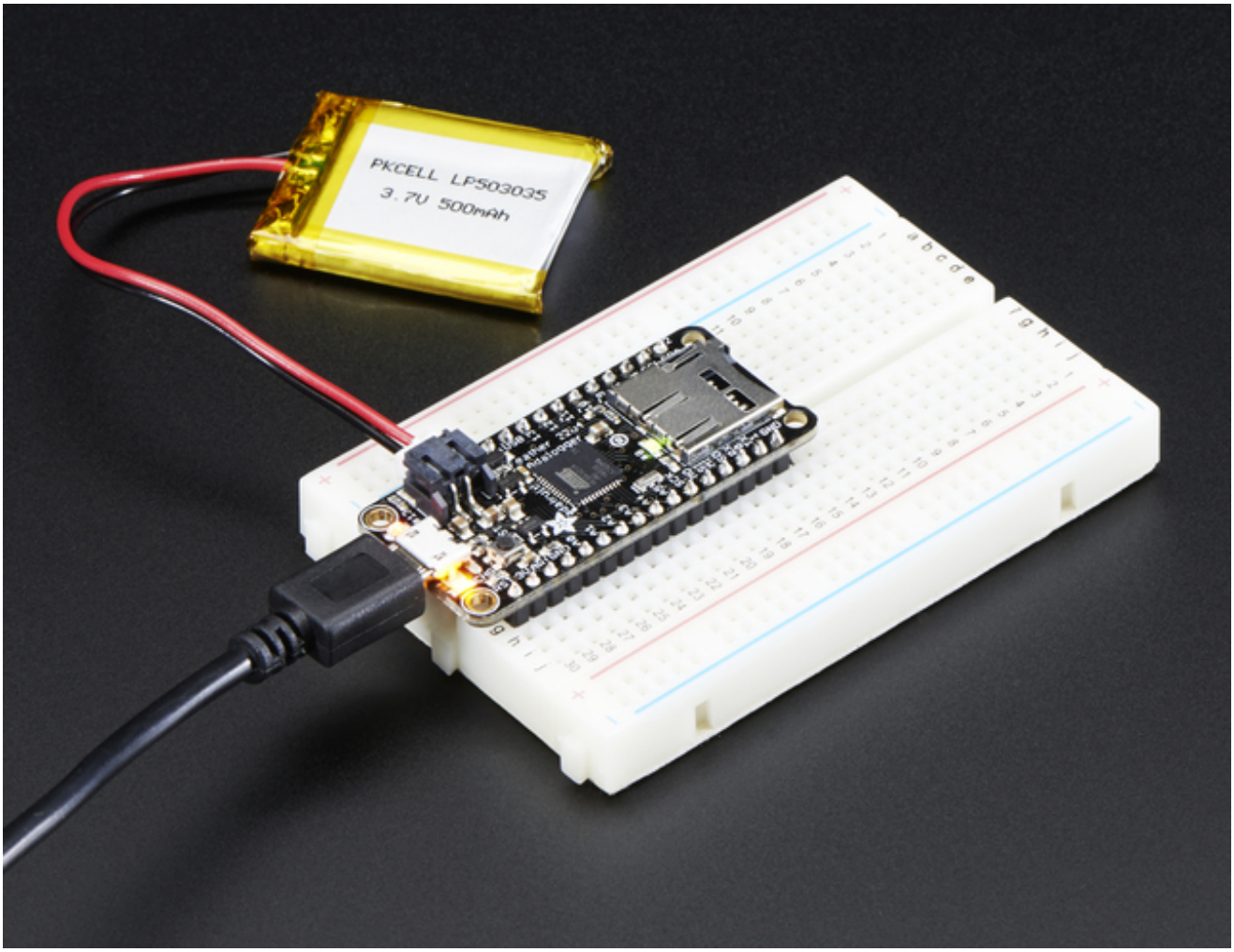


Feather is the new development board from Adafruit, and like it's namesake it is thin, light, and lets you fly! We designed Feather to be a new standard for portable microcontroller cores.

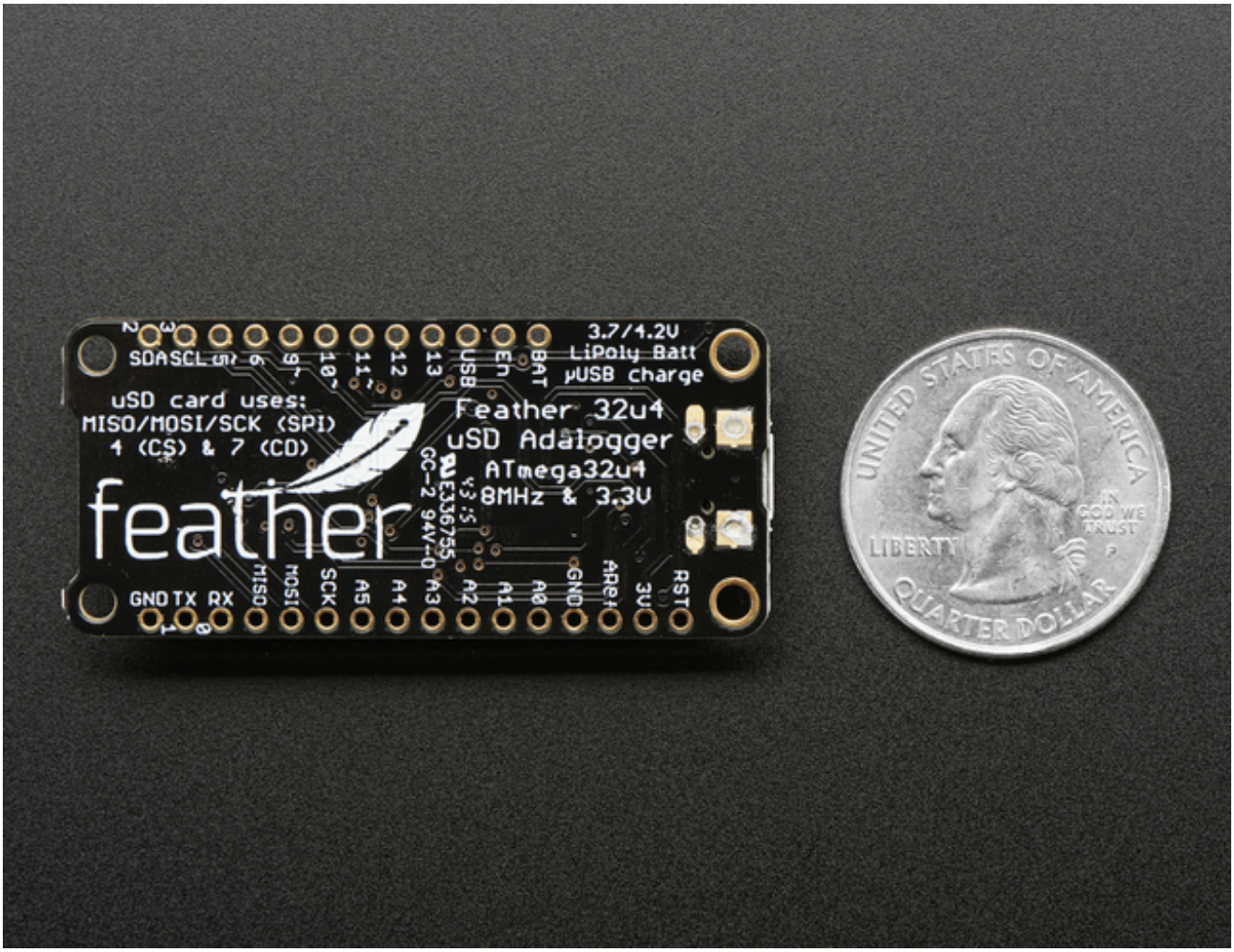
This is the **Adafruit Feather 32u4 Adalogger** - our take on an 'all-in-one' datalogger (or data-reader) with built in USB and battery charging. Its an Adafruit Feather 32u4 with a microSD holder ready to rock!



At the Feather 32u4's heart is at ATmega32u4 clocked at 8 MHz and at 3.3V logic, a chip setup we've had tons of experience with as [it's the same as the Flora](http://adafru.it/dVl). This chip has 32K of flash and 2K of RAM, with built in USB so not only does it have a USB-to-Serial program & debug capability built in with no need for an FTDI-like chip, it can also act like a mouse, keyboard, USB MIDI device, etc.



To make it easy to use for portable projects, we added a connector for any of our 3.7V Lithium polymer batteries and built in battery charging. You don't need a battery, it will run just fine straight from the micro USB connector. But, if you do have a battery, you can take it on the go, then plug in the USB to recharge. The Feather will automatically switch over to USB power when its available. We also tied the battery thru a divider to an analog pin, so you can measure and monitor the battery voltage to detect when you need a recharge.



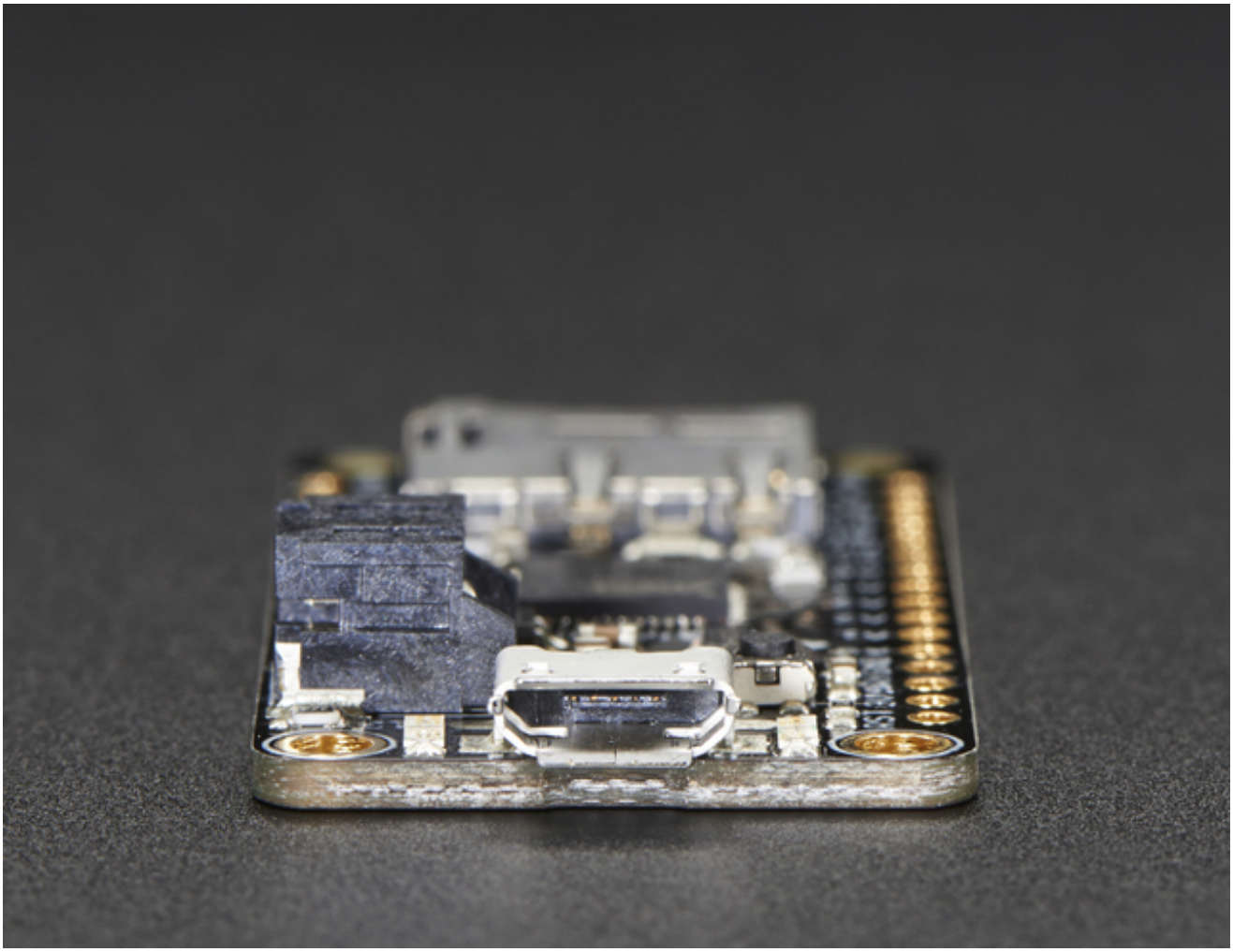
Here's some handy specs! Like all Feather 32u4's you get:

- Measures 2.0" x 0.9" x 0.28" (51mm x 23mm x 8mm) without headers soldered in
- Light as a (large?) feather - 5.1 grams
- ATmega32u4 @ 8MHz with 3.3V logic/power
- 3.3V regulator with 500mA peak current output
- USB native support, comes with USB bootloader and serial port debugging
- You also get tons of pins - 20 GPIO pins
- Hardware Serial, hardware I2C, hardware SPI support
- 8 x PWM pins
- 10 x analog inputs
- Built in 100mA lipoly charger with charging status indicator LED
- Pin #13 red LED for general purpose blinking
- Power/enable pin
- 4 mounting holes
- Reset button

The **Feather 32u4 Adalogger** uses the extra space left over to add MicroSD + a green

LED:

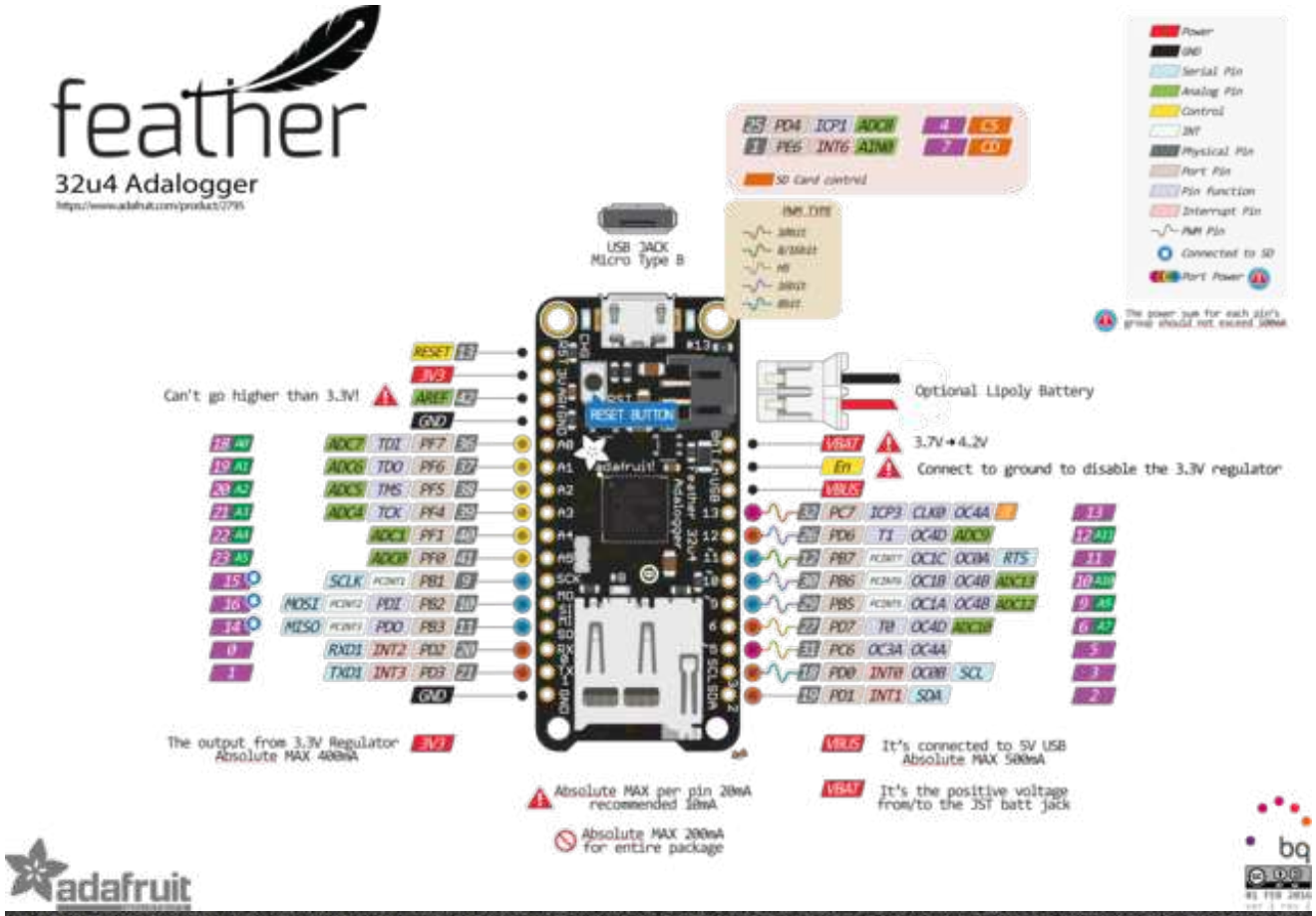
- Pin #8 green LED for your blinking pleasure
- MicroSD card holder for adding as much storage as you could possibly want, for reading or writing.

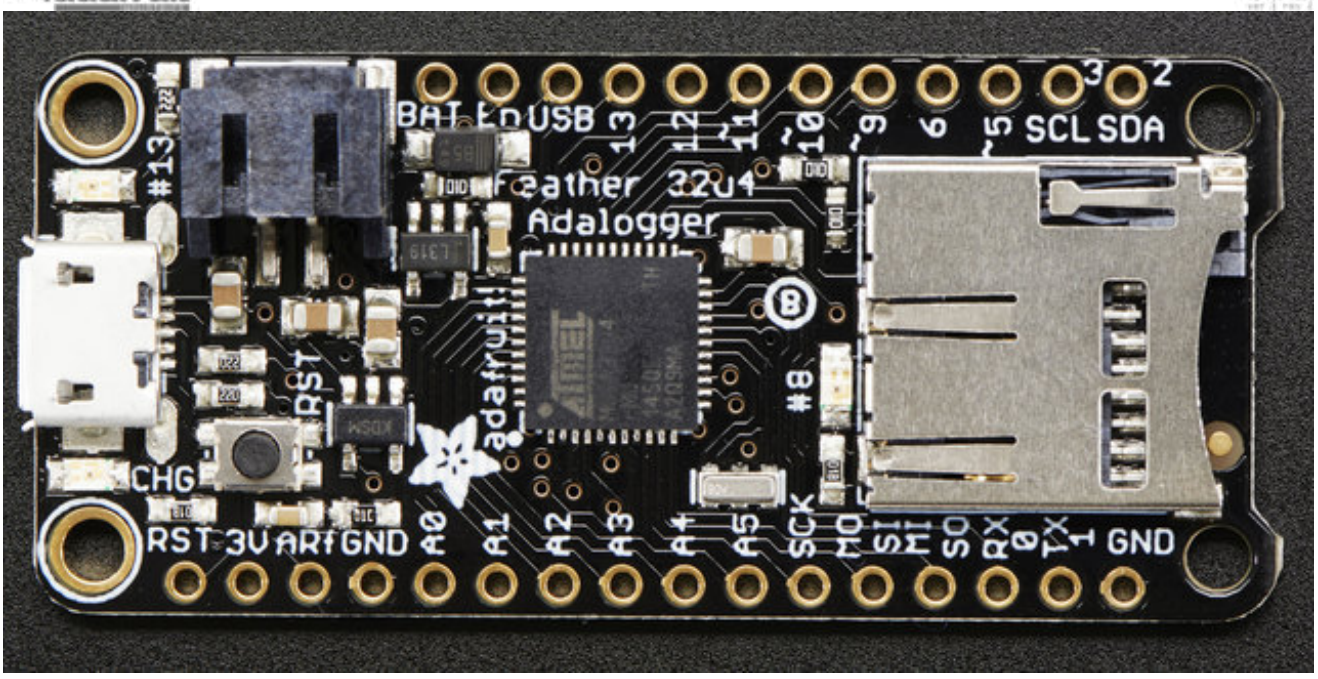


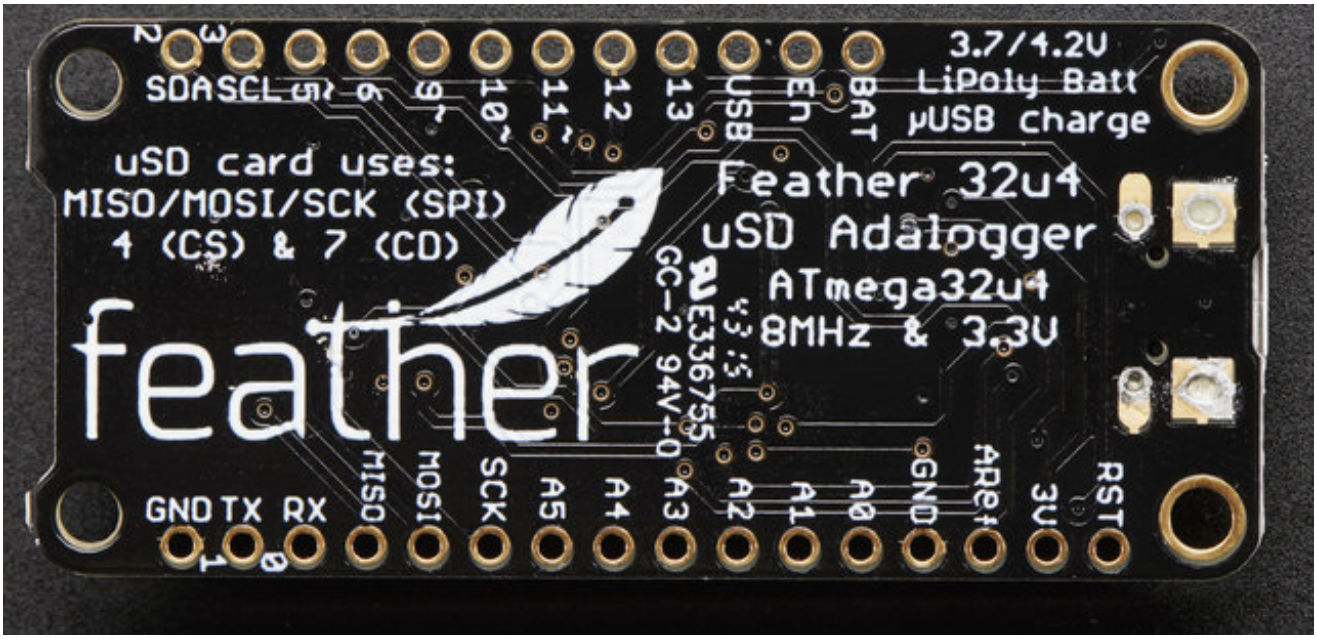
Comes fully assembled and tested, with a USB bootloader that lets you quickly use it with the Arduino IDE. We also toss in some header so you can solder it in and plug into a solderless breadboard. **Lipoly battery, MicroSD card and USB cable not included** (but we do have lots of options in the shop if you'd like!)

Check out our tutorial for all sorts of details, including schematics, files, IDE instructions, and more!

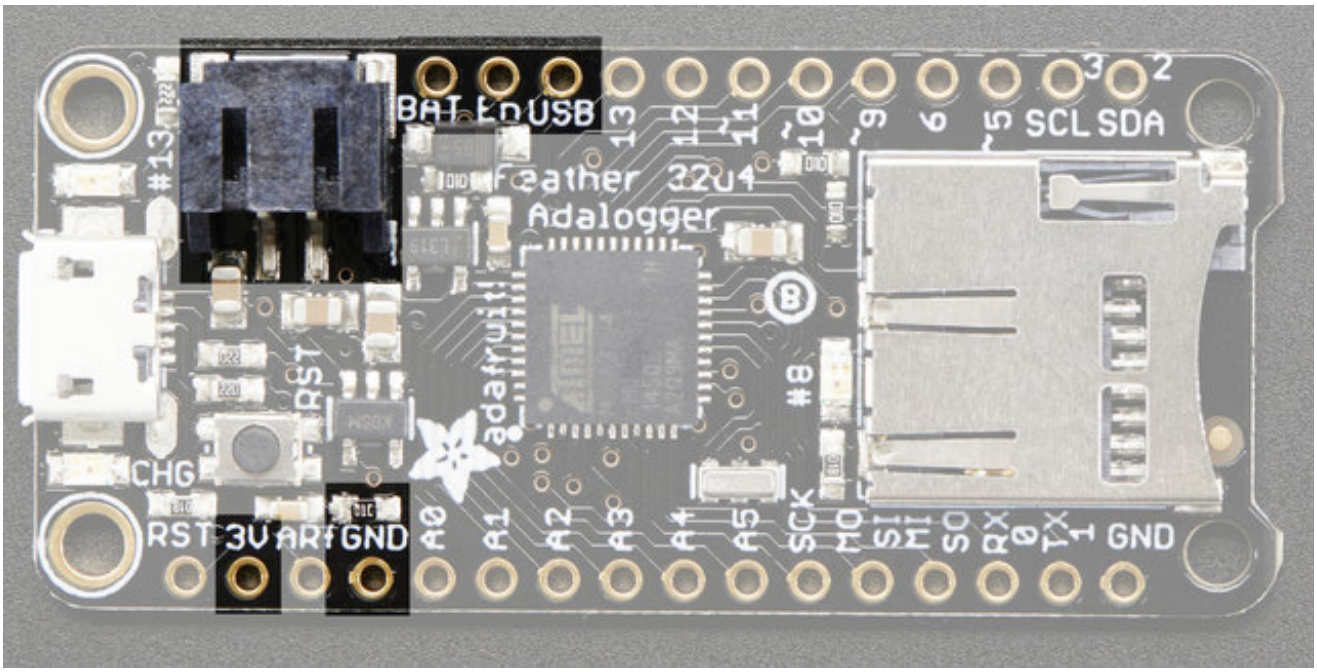
Pinouts


feather
32u4 Adalogger
USB JACK
Micro Type B
RESET BUTTON
Optional Lipoly Battery
Can't go higher than 3.3V!
3.7V→4.2V
Connect to ground to disable the 3.3V regulator
The output from 3.3V Regulator
Absolute MAX 400mA
It's connected to 5V USB
Absolute MAX 500mA
Absolute MAX per pin 20mA
recommended 10mA
It's the positive voltage
from/to the JST batt jack
Absolute MAX 200mA
for entire package
adafruit
bq


BAT EN USB
SCL SDA
Feather 32u4
Adalogger
CHG
RST
RST 3V ARF GND A0 A1 A2 A3 A4 A5 SCK MO MI SO RX TX GND



Power Pins



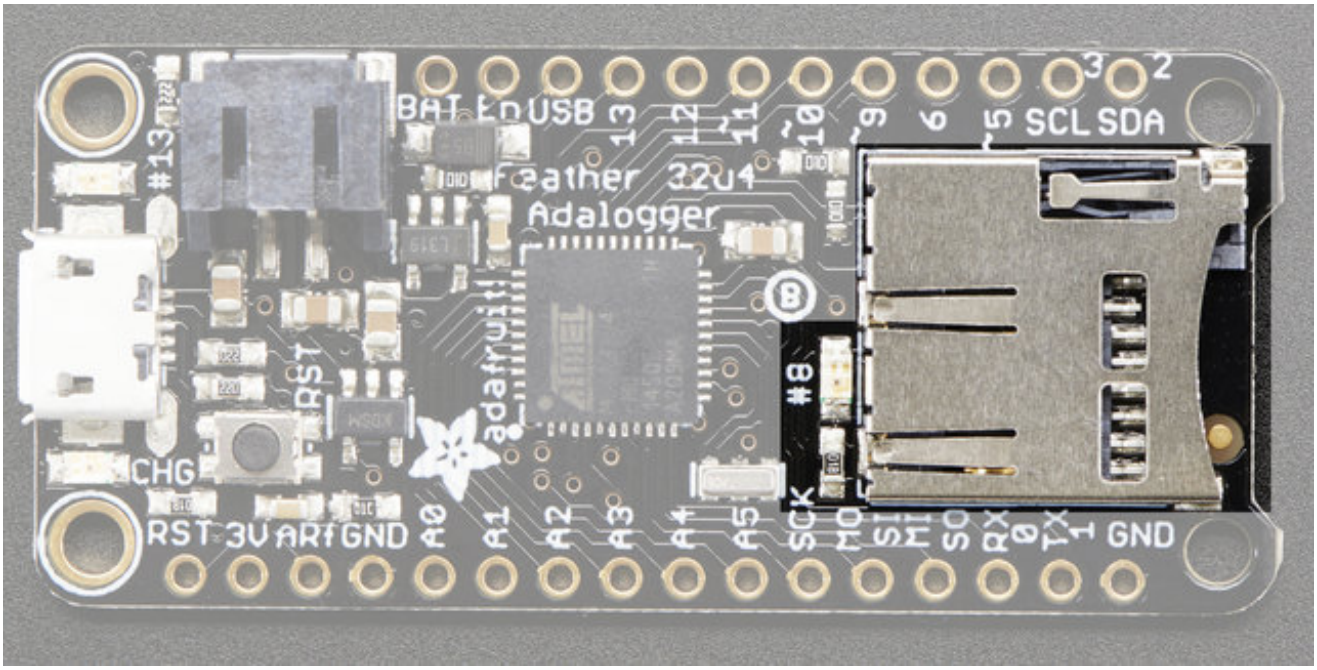
- **GND** - this is the common ground for all power and logic
- **BAT** - this is the positive voltage to/from the JST jack for the optional Lipoly battery
- **USB** - this is the positive voltage to/from the micro USB jack if connected
- **EN** - this is the 3.3V regulator's enable pin. It's pulled up, so connect to ground to disable the 3.3V regulator
- **3V** - this is the output from the 3.3V regulator, it can supply 500mA peak

Logic pins

This is the general purpose I/O pin set for the microcontroller. All logic is 3.3V

- **#0** / **RX** - GPIO #0, also receive (input) pin for **Serial1** and Interrupt #2
- **#1** / **TX** - GPIO #1, also transmit (output) pin for **Serial1** and Interrupt #3
- **#2** / **SDA** - GPIO #2, also the I2C (Wire) data pin. There's no pull up on this pin by default so when using with I2C, you may need a 2.2K-10K pullup. Also Interrupt #1
- **#3** / **SCL** - GPIO #3, also the I2C (Wire) clock pin. There's no pull up on this pin by default so when using with I2C, you may need a 2.2K-10K pullup. Can also do PWM output and act as Interrupt #0.
- **#5** - GPIO #5, can also do PWM output
- **#6** - GPIO #6, can also do PWM output and analog input **A7**
- **#9** - GPIO #9, also analog input **A9** and can do PWM output. This analog input is connected to a voltage divider for the lipoly battery so be aware that this pin naturally 'sits' at around 2VDC due to the resistor divider
- **#10** - GPIO #10, also analog input **A10** and can do PWM output.
- **#11** - GPIO #11, can do PWM output.
- **#12** - GPIO #12, also analog input **A11**
- **#13** - GPIO #13, can do PWM output and is connected to the **red LED** next to the USB jack
- **A0 thru A5** - These are each analog input as well as digital I/O pins.
- **SCK**/**MOSI**/**MISO** - These are the hardware SPI pins, **used by the microSD card too!** You can use them as everyday GPIO pins if the SD card is not inserted. However, we really recommend keeping them free as they should be kept available for the SD. If they are used, make sure its with a device that will kindly share the SPI bus! Also used to reprogram the chip with an AVR programmer if you need.

Micro SD Card + Green LED



Since not all pins can be brought out to breakouts, due to the small size of the Feather, we use these to control the SD card!

- **#4** - used as the MicroSD card**CS** (chip select) pin
- **#7** - used as the MicroSD card**CD** (card detect) pin. If you want to detect when a card is inserted/removed, configure this pin as an input with a pullup. When the pin reads low (0V) then there is no card inserted. When the pin reads high, then a card is in place. It will not tell you if the card is valid, its just a mechanical switch
- **#8** - This pin was also left over, so we tied it to a green LED, its next to the SD card. It might be handy to blink this LED when writing / reading valid data or some other user-alert!

Other Pins!

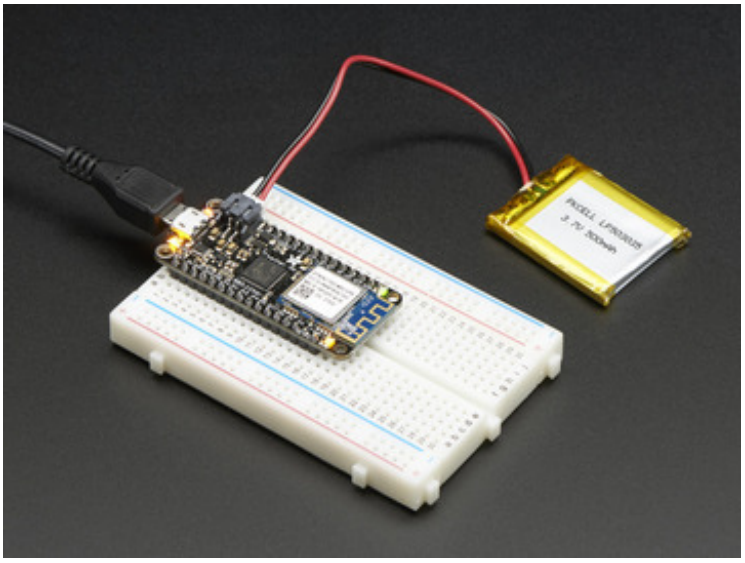
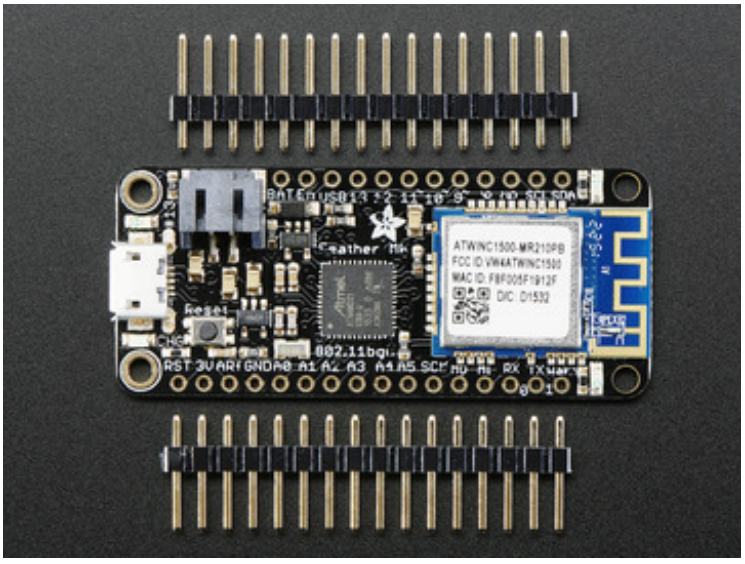
- **RST** - this is the Reset pin, tie to ground to manually reset the AVR, as well as launch the bootloader manually
- **ARef** - the analog reference pin. Normally the reference voltage is the same as the chip logic voltage (3.3V) but if you need an alternative analog reference, connect it to this pin and select the external AREF in your firmware. Can't go higher than 3.3V!

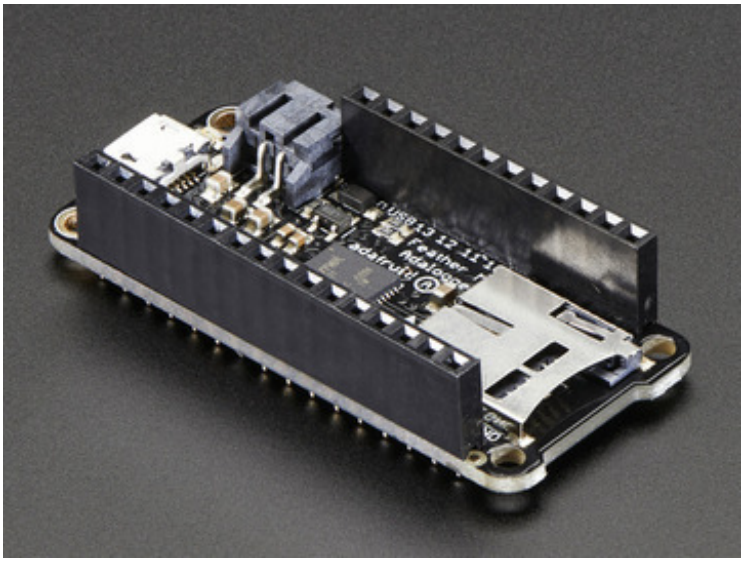
Assembly

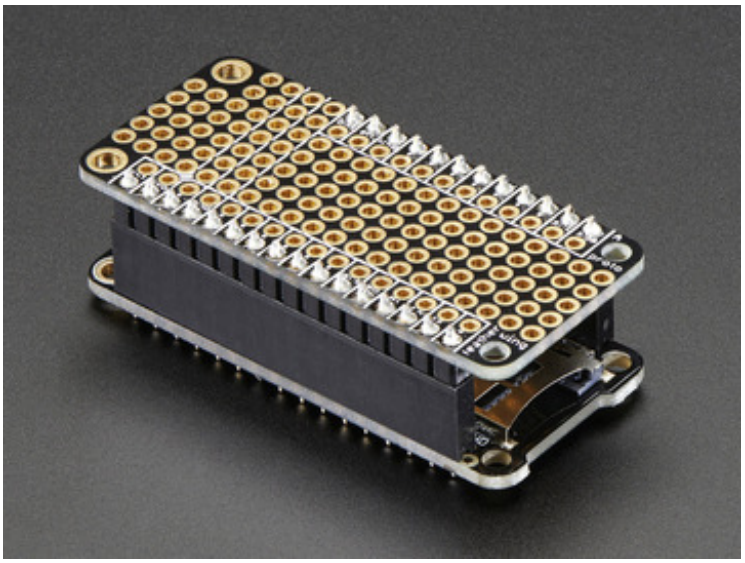
We ship Feathers fully tested but without headers attached - this gives you the most flexibility on choosing how to use and configure your Feather

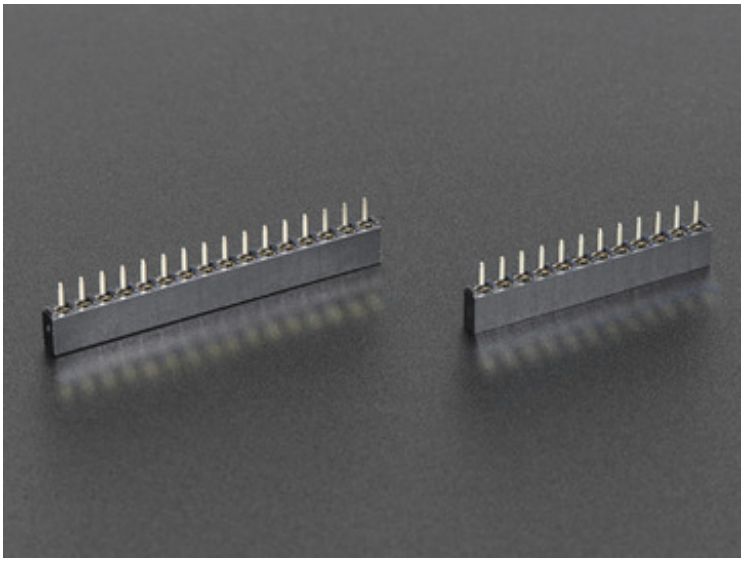
Header Options!

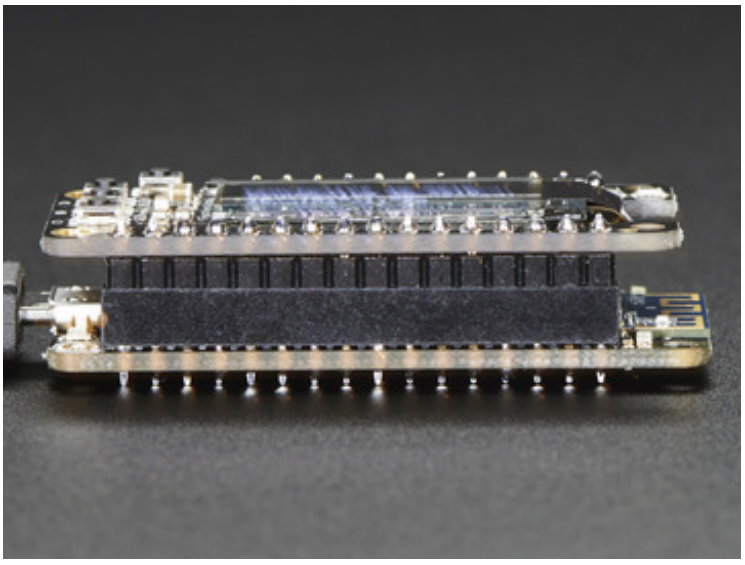
Before you go gung-ho on soldering, there's a few options to consider!

- 
  The first option is soldering in plain male headers, this lets you plug in the Feather into a solderless breadboard
- 

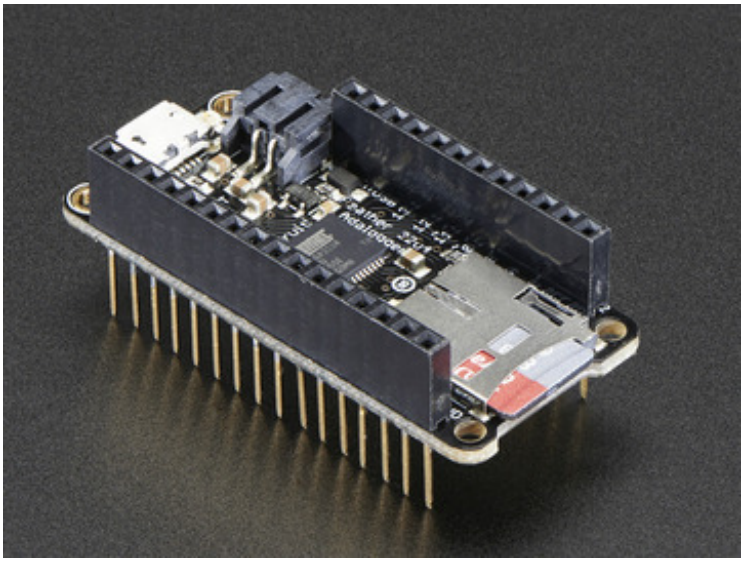
- 

Another option is to go with socket female headers. This won't let you plug the Feather into a breadboard but it will let you attach featherwings very easily
- 

- 

  We also have 'slim' versions of the female headers, that are a little shorter and give a more compact shape
- 

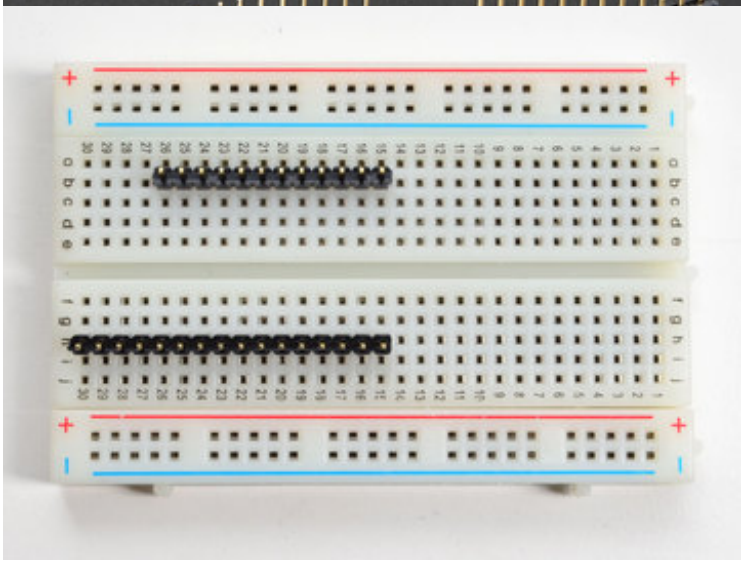
Finally, there's the "Stacking Header" option. This one is sort of the best-of-both-worlds. You get the ability to plug into a

- 

solderless breadboard *and* plug a featherwing on top. But its a little bulky

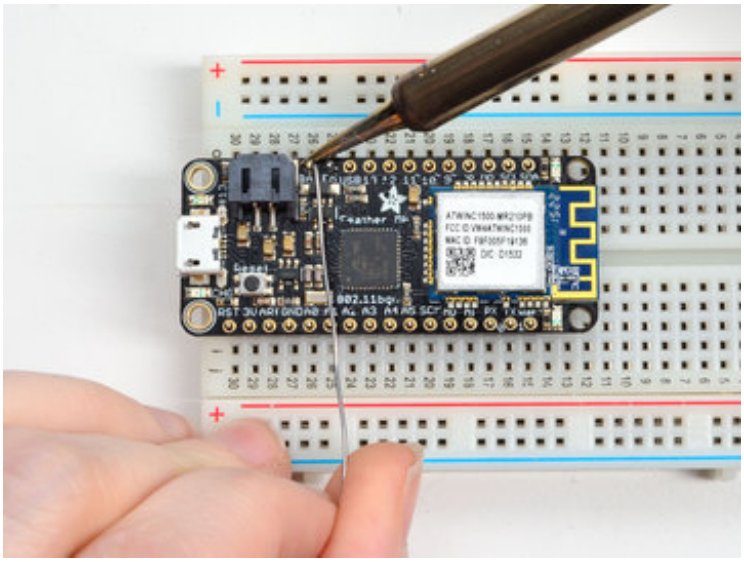
- 

Soldering in Plain Headers

- 

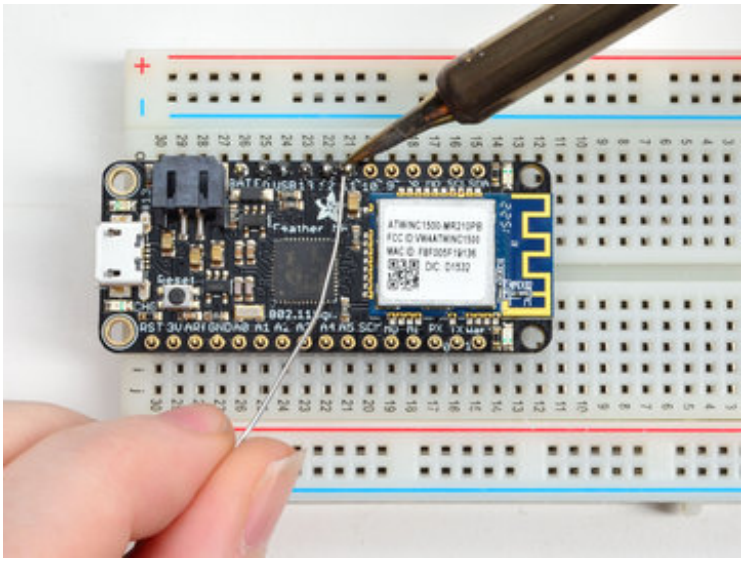
Prepare the header strip:

- Cut the strip to length if necessary. It will be easier to solder if you insert it into a breadboard - **long pins down**

- 

Add the breakout board:

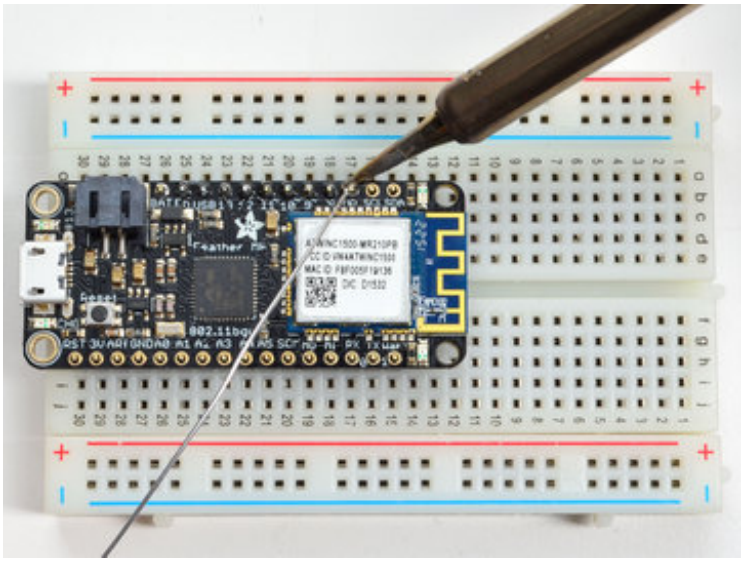
Place the breakout board over the pins so that the short pins poke through the breakout pads

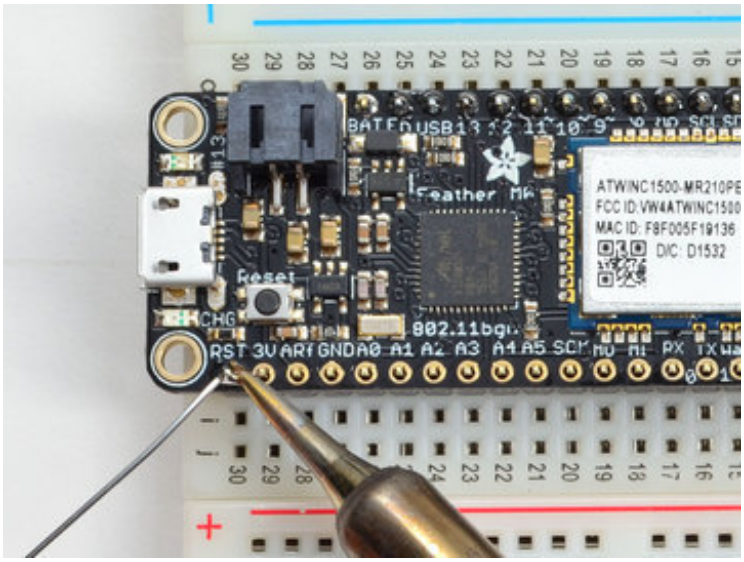
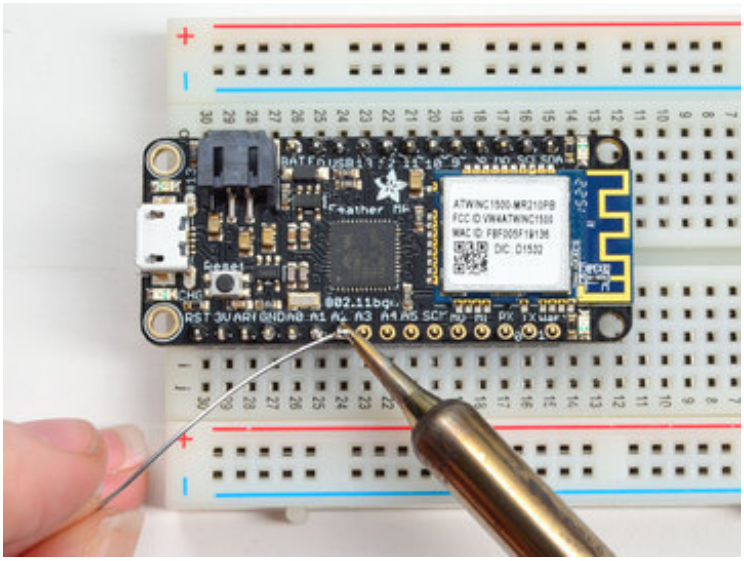
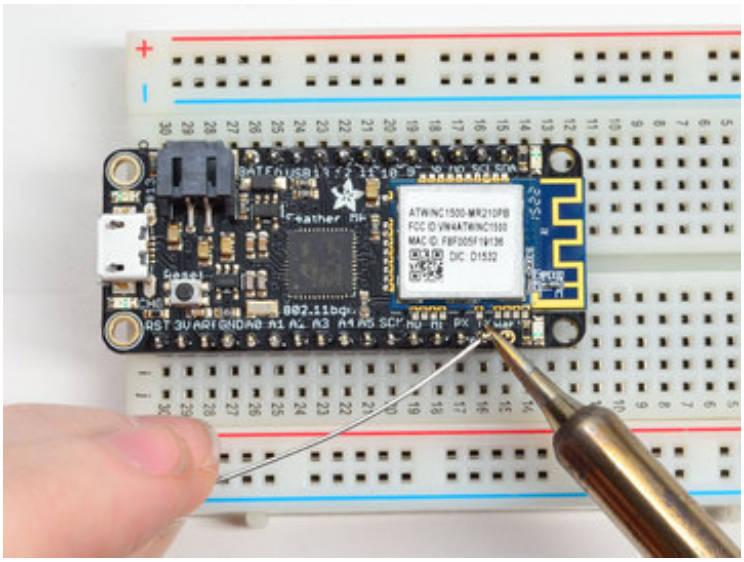
- 

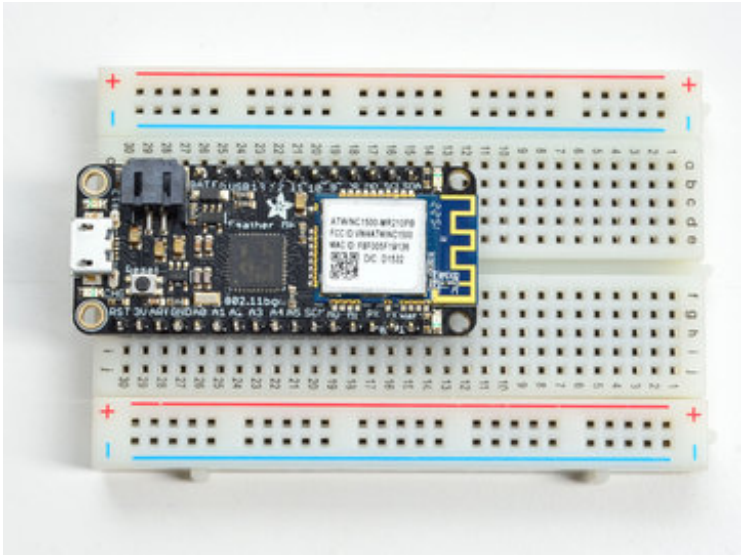
And Solder!

Be sure to solder all pins for reliable electrical contact.

(For tips on soldering, be sure to check out our [Guide to Excellent Soldering](http://adafru.it/aTk) (http://adafru.it/aTk).

- 

- 
- 
Solder the other strip as well.
- 

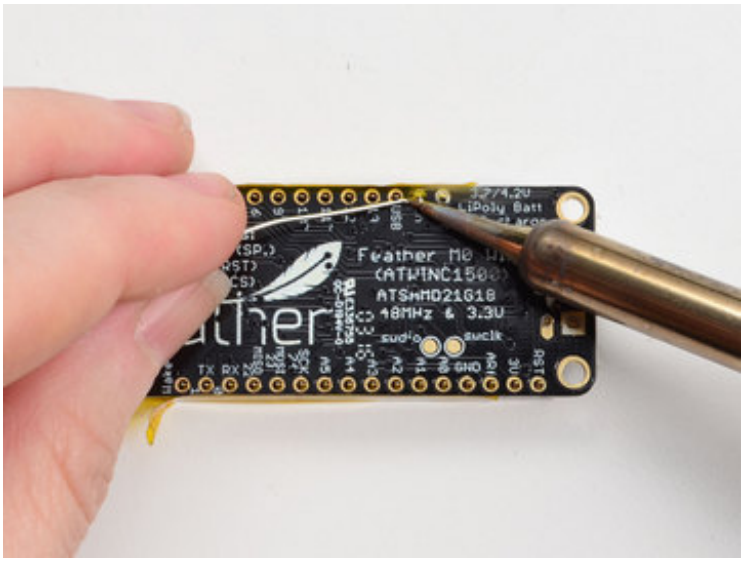
- 
  You're done! Check your solder joints visually and continue onto the next steps

Soldering on Female Header

- 

Tape In Place

For sockets you'll want to tape them in place so when you flip over the board they don't fall out

- 

Flip & Tack Solder

After flipping over, solder one or two points on each strip, to 'tack' the header in place

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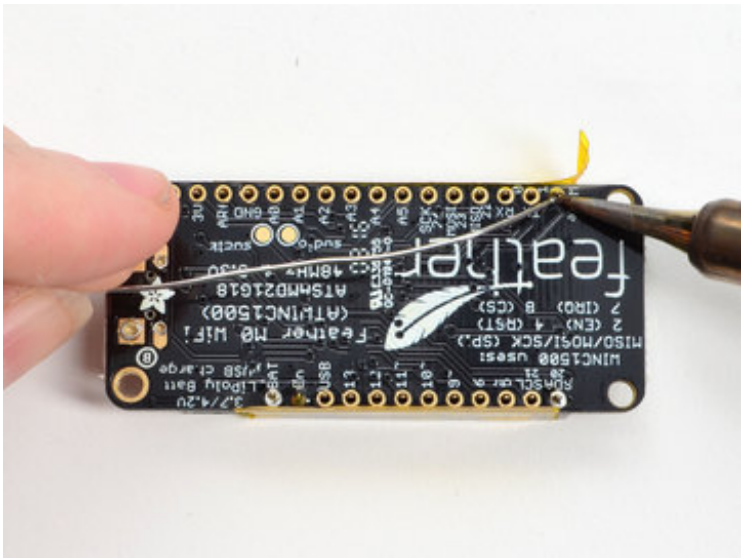
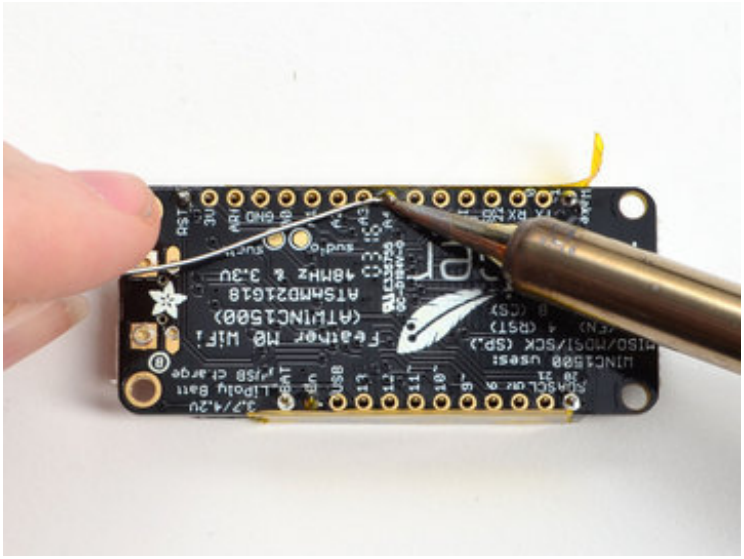
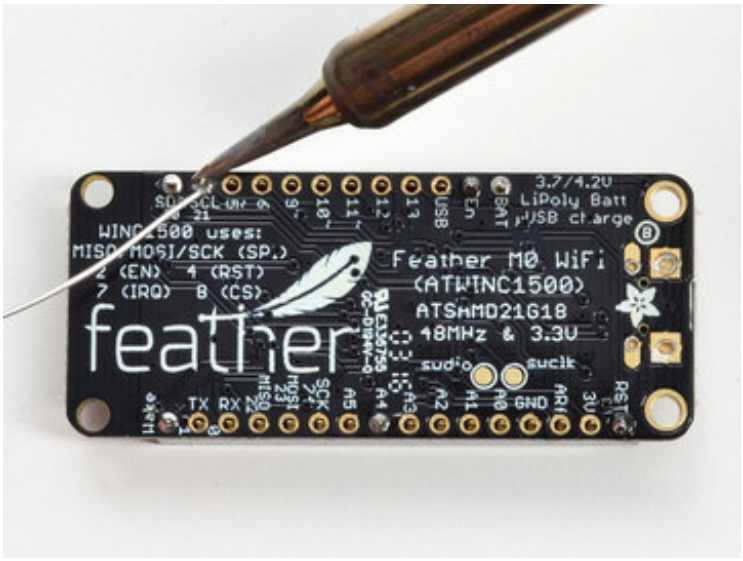
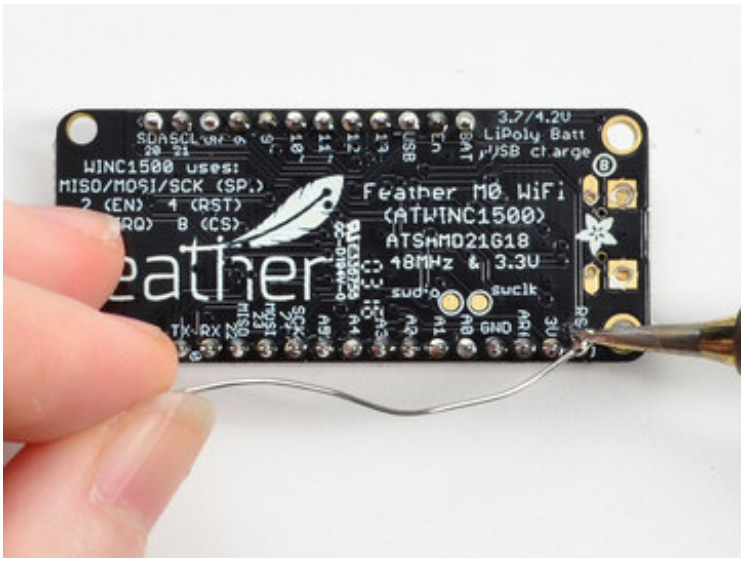
- 

And Solder!

Be sure to solder all pins for reliable electrical contact.

(For tips on soldering, be sure to

- 
- 

- 

check out our [Guide to Excellent Soldering](http://adafru.it/aTk) (http://adafru.it/aTk)).

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You're done! Check your solder joints visually and continue onto the next steps

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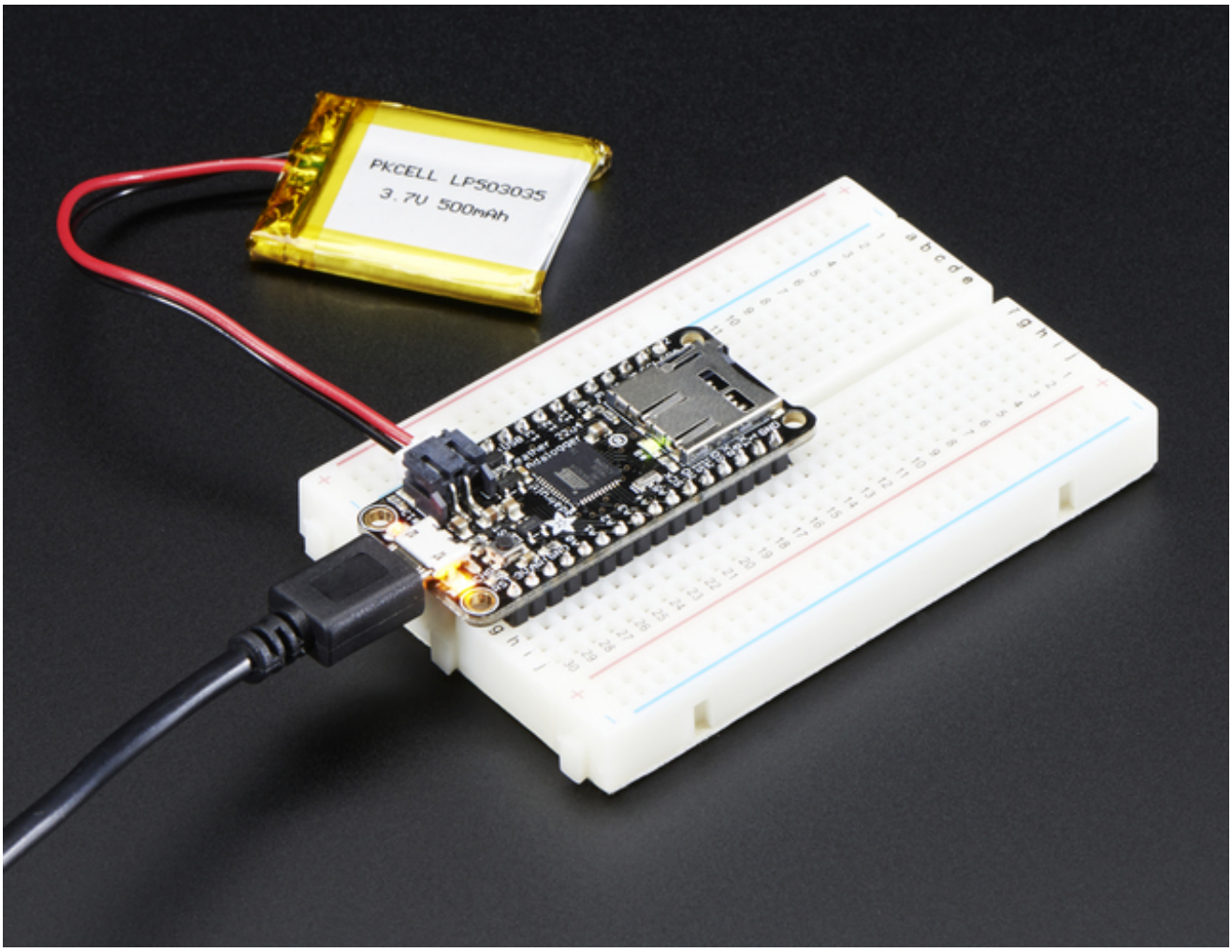
Power Management



Battery + USB Power

We wanted to make the Feather easy to power both when connected to a computer as well as via battery. There's **two ways to power** a Feather. You can connect with a MicroUSB cable (just plug into the jack) and the Feather will regulate the 5V USB down to 3.3V. You can also connect a 4.2/3.7V Lithium Polymer (Lipo/Lipoly) or Lithium Ion (LiIon) battery to the JST jack. This will let the Feather run on a rechargable battery. **When the USB power is powered, it will automatically switch over to USB for power, as well as start charging the battery (if attached) at 100mA.** This happens 'hotswap' style so you can always keep the Lipoly connected as a 'backup' power that will only get used when USB power is lost.