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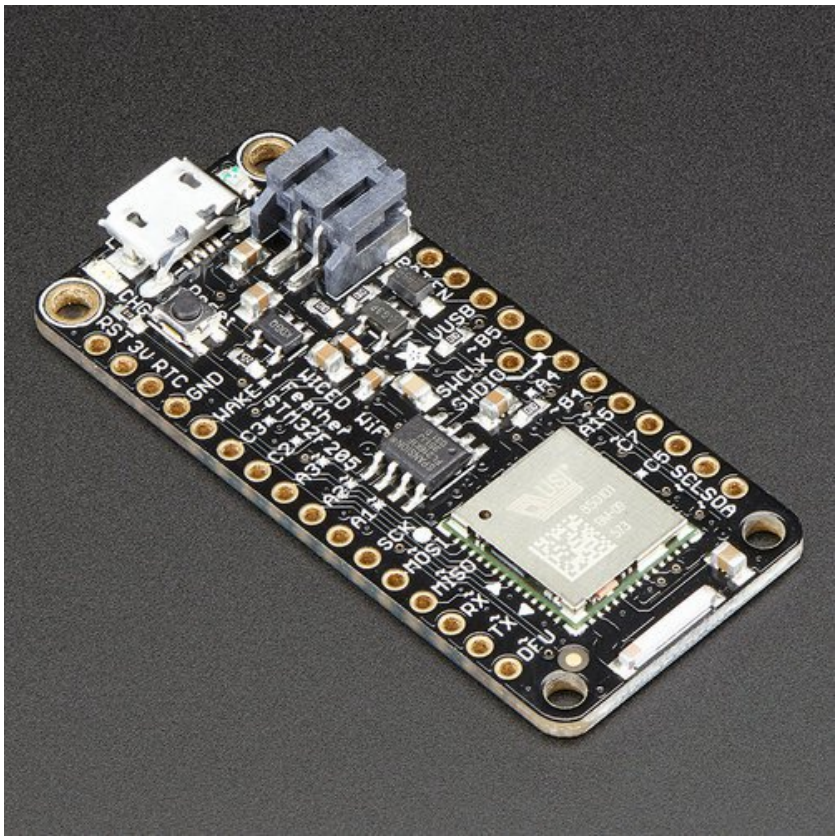
Introducing the Adafruit WICED Feather WiFi

Created by Kevin Townsend



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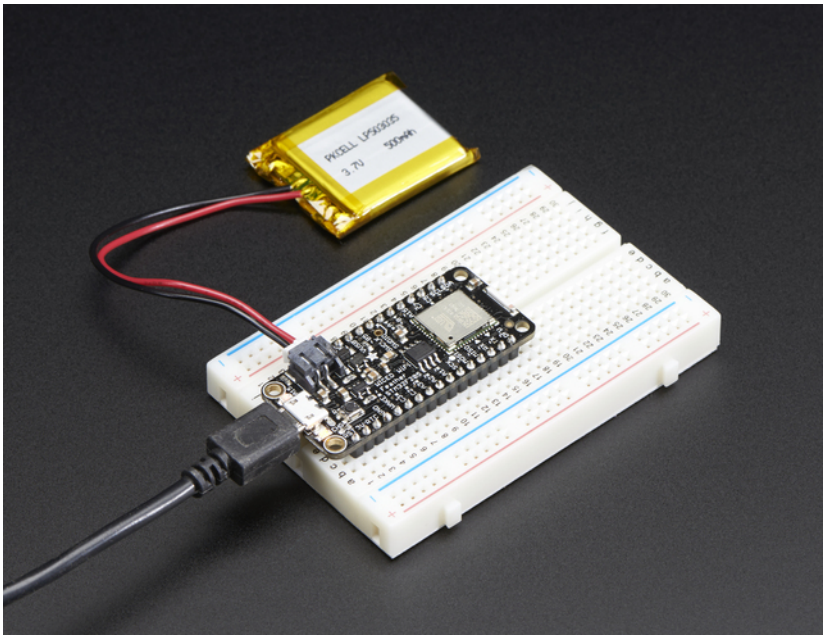
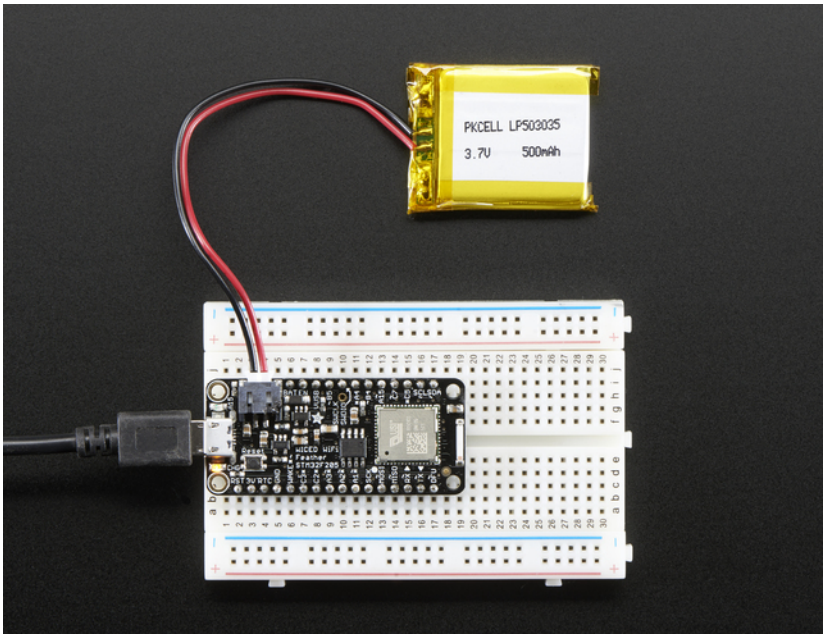
Overview



Feather (http://adafru.it/l7B) is the new development board from Adafruit, and like its 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 WICED Feather** - it's our most powerful Feather yet!We have other boards in the Feather family, check'em out here. (http://adafru.it/l7B)

Say "Hi!" the WICED Feather! Perfect for your next Internet connected project, with a processor and WiFi core that can take anything you throw at it!



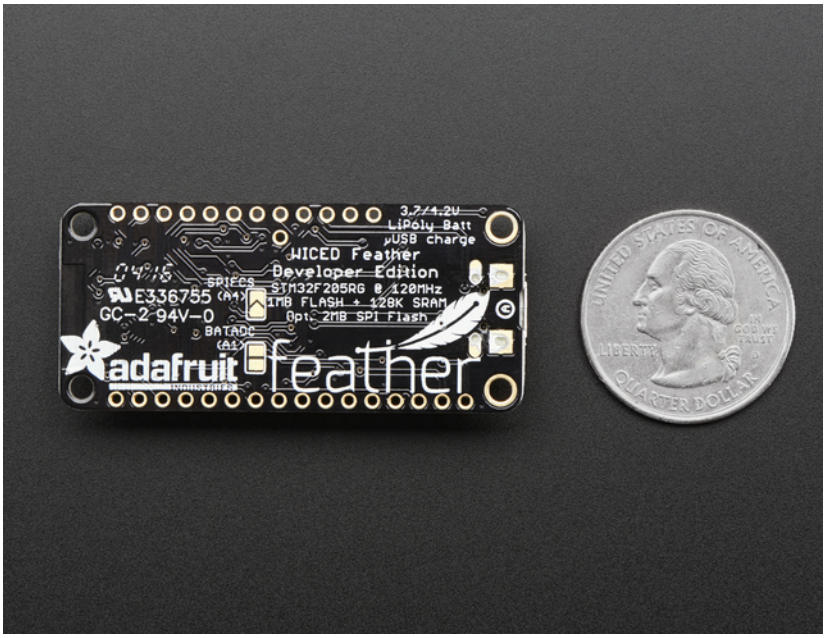
The WICED Feather is based on Broadcom's WICED (Wireless Internet Connectivity for Embedded Devices) platform, and is paired up with a powerful STM32F205 ARM Cortex M3 processor running at 120MHz, with support for TLS 1.2 to access sites and web services safely and securely.

We spent a lot of time adding support for this processor and WiFi chipset to the Arduino IDE you know and love. Programming doesn't rely on any online or third party tools to build, flash or run your code. You write your code in the Arduino IDE using many of the same standard libraries you've always used (Wire, SPI, etc.), compile locally, and the device is flashed directly from the IDE over USB. **Note that this chipset is not**

identical to the Arduino standard-supported Atmega series and many libraries that are written for AVR will not compile or work with WICED!

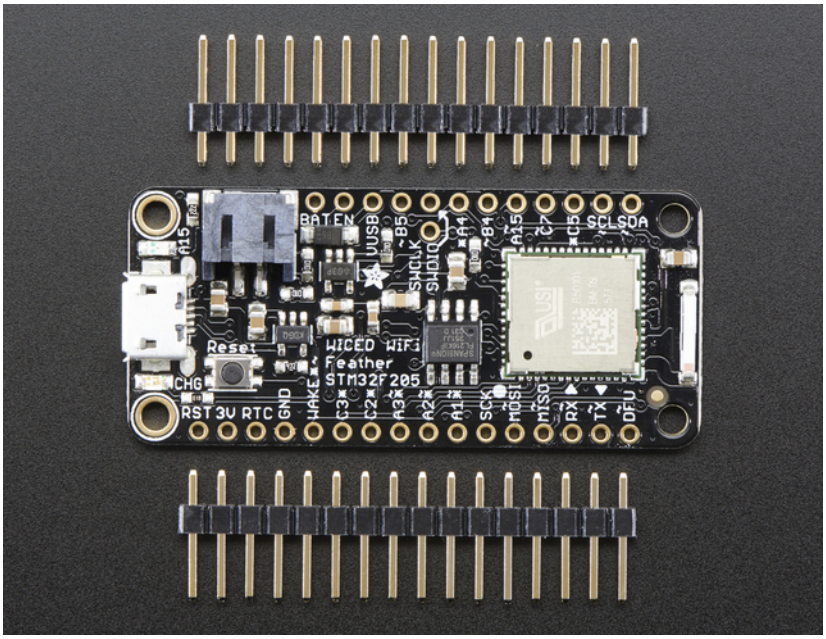
Since the WICED Feather is based on the standard Adafruit Feather (http://adafru.it/mf2) layout, you also have instant access to a variety of Feather Wings, as well as all the usual standard breakouts available from Adafruit or other vendors.

After more than a year of full time effort in the making, we think it's the best and most flexible WiFi development board out there, and the easiest way to get your TCP/IP-based project off the ground without sacrificing flexibility or security. We even cooked in some built-in libraries in the WiFi core, wuch as TCP client and Server, HTTP client and server, and MQTT client (with easy Adafruit IO interfacing).



The WICED Feather has the following key features:

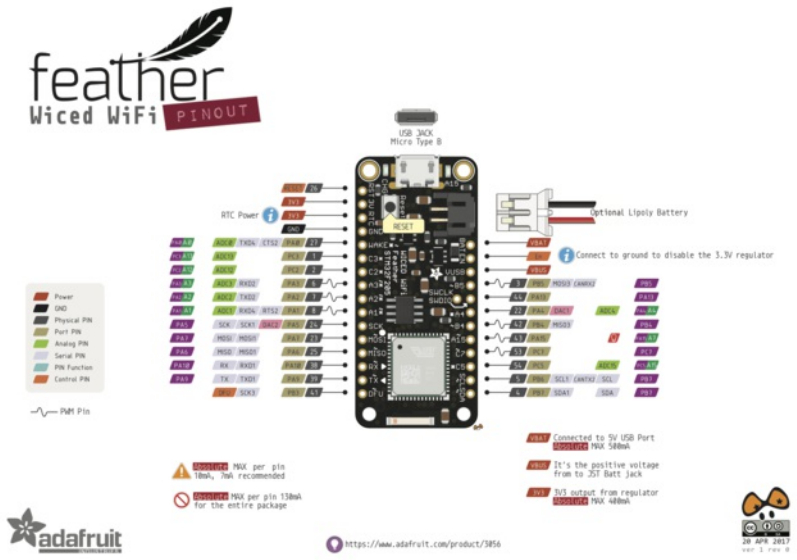
- Measures 2.0" x 0.9" x 0.28" (51mm x 23mm x 8mm) without headers soldered in
- Light as a (large?) feather - 5.7 grams
- STM32F205RG (http://adafru.it/m9A) 120MHz ARM Cortex M3 MCU
- BCM43362 (http://adafru.it/meC) 802.11b/G/N radio
- 128KB SRAM and 1024KB flash memory (total)
- 16KB SRAM and 128KB flash available for user code
- 16MBit (2MB) SPI flash for additional data storage
- Built in Real Time Clock (RTC) with optional external battery supply
- Hardware SPI and I2C (including clock-stretching)
- 12 standard GPIO pins, with additional GPIOs available via SPI, UART and I2C pins
- 7 standard PWM outputs, with additional outputs available via SPI, UART and I2C pins
- Up to 8 12-bit ADC inputs
- Two 12-bit DAC outputs (Pins A4 and SCK/A5)
- Up to 3 UARTs (including one with full HW flow control)
- TLS 1.2 support to access secure HTTPS and TCP servers
- On board single-cell LIPO charging and battery monitoring
- Fast and easy firmware updates to keep your module up to date
- Based on the excellent community-supported Maple (http://adafru.it/mpE) project



Comes fully assembled and tested, with a USB bootloader that lets you quickly use it with the Arduino IDE. We also toss in some headers so you can solder it in and plug into a solderless breadboard. **Lipoly battery (http://adafru.it/e0v) and MicroUSB cable (http://adafru.it/aM5) not included** (but we do have lots of options in the shop if you'd like!)

Our learn guide will show you everything you need to know to get your projects online, and connected to the outside world!

Board Layout

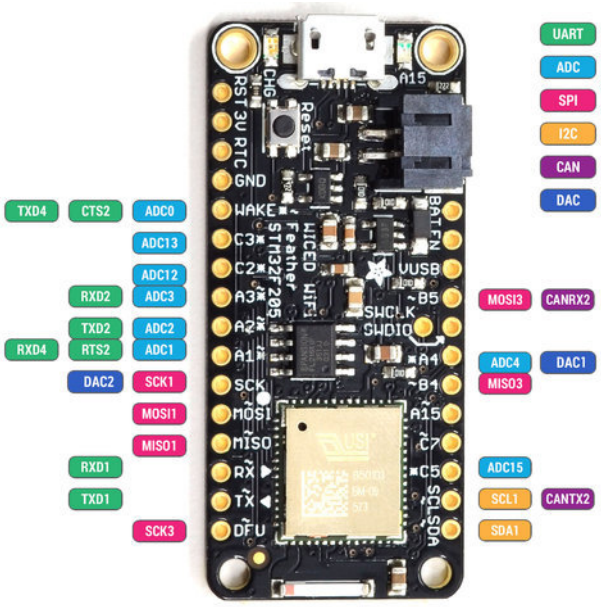


The WICED Feather uses the same standard pinout as the rest of the[Feather family](http://adafru.it/m0b) (http://adafru.it/m0b), allowing you to use the same Feather Wings across all your compatible devices.

It has the standard Feather on board LIPO battery charger (simply connect a LIPO battery and USB power at the same time), and 3.3V voltage regulation from either USB or VBAT (the LIPO cell) with automatic switching between power supplies.

Pin Multiplexing

The pins on the WICED Feather can be configured for several different purposes, with the main config options shown in the illustration below:



Accessing Pins in Software

For most pin names, you **must append 'P'** to the pin name shown on the silk screen. The table below lists the pin names on the silkscreen and their corresponding macro in your Arduino code:

Slikscreen	Arduino Code	Note(s)
WAKE	WAKE or PA0	-
C3	PC3	-
C2	PC2	-
A3	PA3	-
A2	PA2	-
A1	PA1	-
SCK	SCK or PA5	-
MOSI	MOSI or PA7	-
MISO	MISO or PA6	-
RX	PA10	-
TX	PA9	-
DFU	PB3	-
B5	PB5	-
SWCLK	PA14	-
SWDIO	PA13	-
A4	P14	-
B4	PB4	-
A15	PA15	-
C7	PC7	-
C5	PC5	-
SCL	PB6	-
SDA	PB7	-

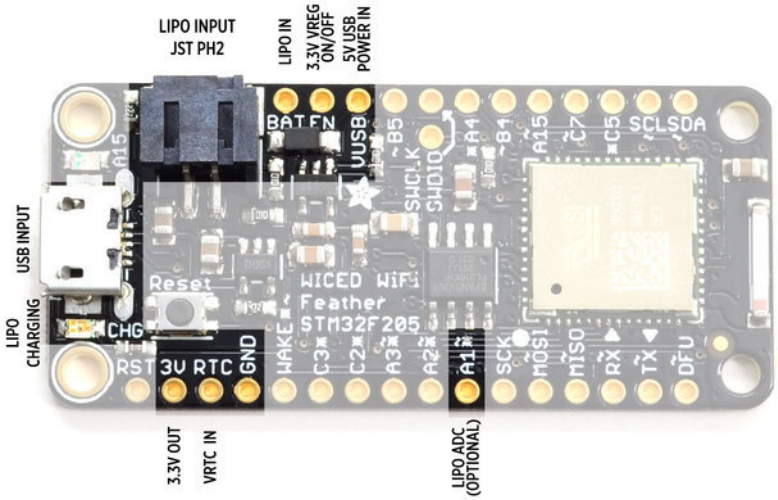
Other notable pins defined in[feather.h](http://adafru.it/olD) include:

Main Macro Name	Direct Arduino Pin Name
BOARD_LED_PIN	PA15

For further details on the board layout, see the[schematic here](http://adafru.it/olE).

Power Config

The WICED Feather can be run from either 5V USB power or a standard ~3.7V LIPO cell, and includes the ability to charge LIPO cells from USB power when both are connected at the same time.



The following pins are included as part of the WICED Feather's power system:

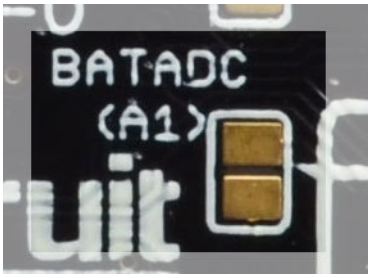
- **3V**: The output of the on-board 3.3V 600mA voltage regulator
- **RTC**: The input for the realt-time clock (RTC) on the STM32F205 (optional)
- **GND**: The common/GND pin which should be connect to GND on any other boards you use

- **BAT**: The input for the 3.7V LIPO cell
- **EN**: The 'EN' switch for the 3.3V voltage regulator. Set this to GND to disable power.
- **VUSB**: The 5V USB power input (USB VBUS)
- **A1**: This pin is optionally connected to a 10K+10K voltage divider that allows you to safely measure the output of the LIPO cell using the internal ADC (analog to digital converter).

LIPO Cell Power Monitoring (A1)

The LIPO battery level can optionally be monitored via a voltage divider configured on ADC pin **A1**.

To enable the 10K + 10K voltage divider (which will divide the LIPO voltage levels in half so that the ADC pin can safely read them), you need to solder shut the **BATADC** solder jumper on the bottom of the PCB:



This will allow you to read the voltage level of the LIPO cell using pin **A1** where each value on the ADC is equal to **0.80566mV** since:

- 3300mV / 4096 (12-bit ADC) = 0.80566406mV per LSB

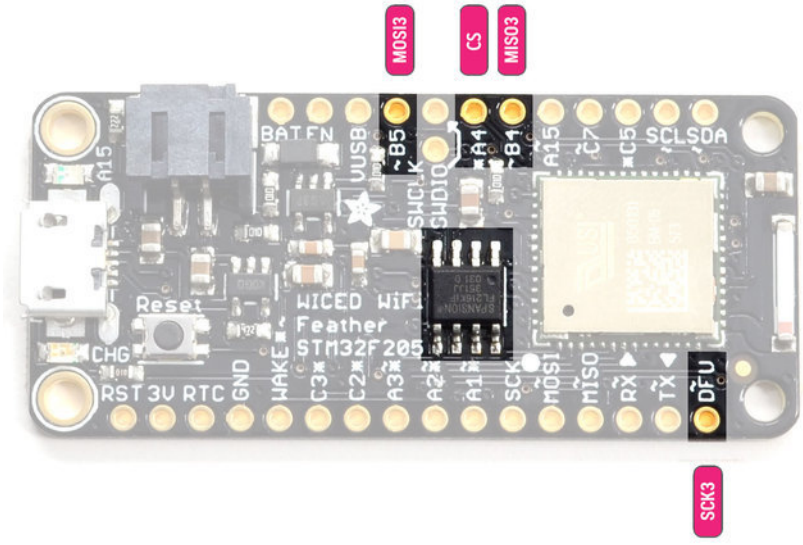
You need to **double** the calculated voltage to compensate for the 10K+10K voltage divider, so in reality every value from the ADC is equal to **1.61133mV** on the LIPO cell, although it appears on the ADC at half that level.

16 Mbit (2MByte) SPI Flash

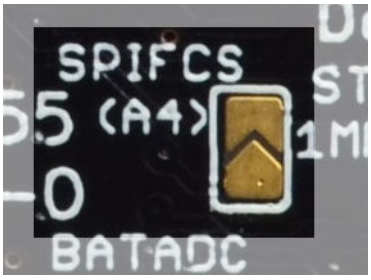
The WICED Feather contains an optional (default = off) 16MBit SPI flash chip that is controlled by FeatherLib.

In order to keep the maximum number of pins available to customers, the SPI flash is disabled by default, but can be enabled with USB Mass Storage support so that you can access the contents on the flash memory from your PC to easily exchange data and files. Simply solder the **SPIFCS** solder jumper on the bottom of the device closed, and make sure you are running FeatherLib version 0.6.0 or higher to enabled flash and USB mass storage support.

The 16MBit SPI Flash is enabled starting with FeatherLib 0.6.0. Please make sure you are running a recent version of FeatherLib when working with the external flash memory.
The SPI3 bus used for SPI flash is controlled by FeatherLib, and the four pins shown below should be avoided in your own sketches when SPI Flash is enabled in a future FeatherLib release.



SPI flash is disabled by default. It can be enabled by soldering the **SPIFCS (A4)** solder jumper on the back of the PCB closed before powering the board up, which will connect the CS/SSEL of the SPI flash to pin **A4**:



PWM Outputs

Pins that can be used as PWM outputs are marked with a tilde character ('~') on the silk screen.

The timers associated with specific PWM outputs are listed below. These timers are important since all PWM outputs on the same HW timer will use the same period or pulse width. This means that if you set the pulse width for PA1, which uses HW Timer 5, this will also set the pulse width for PA2 and PA3 which use the same timer peripheral block.

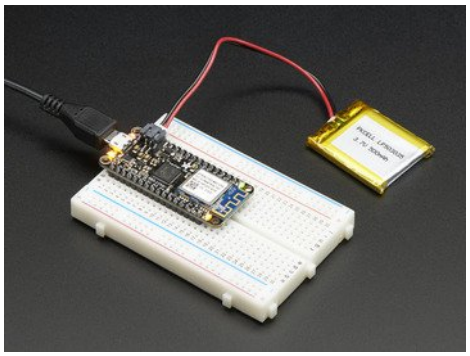
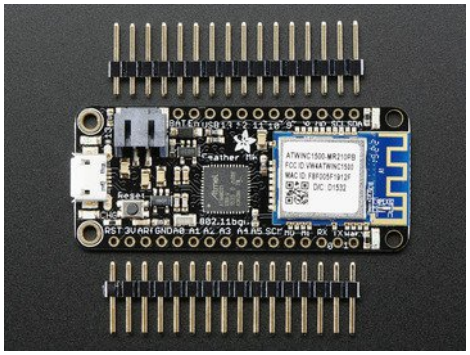
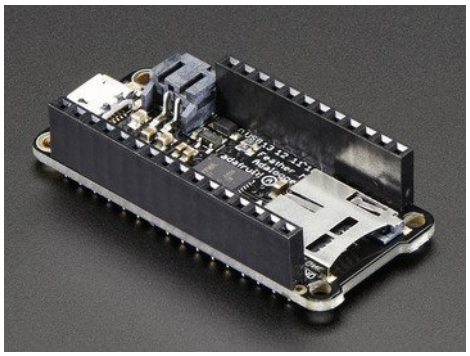
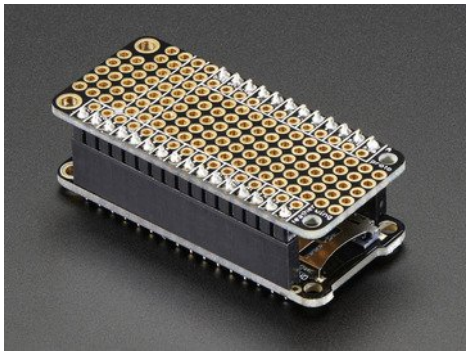
Pin Name	HW Timer	Notes
PA1	Timer 5	
PA2	Timer 5	
PA3	Timer 5	
PA15	Timer 2	Status LED
PB4	Timer 3	
PB5	Timer 3	
PC7	Timer 8	

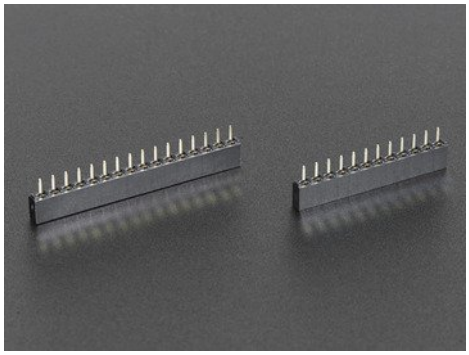
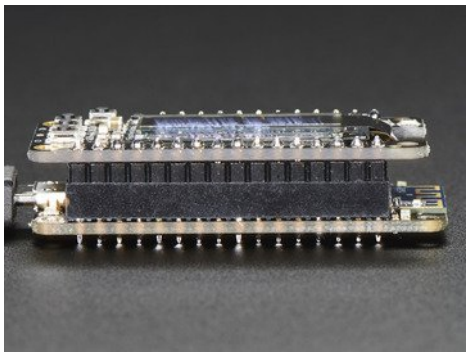
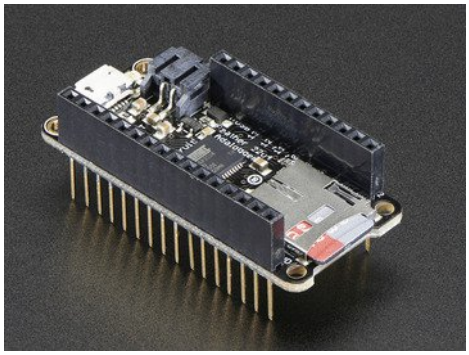
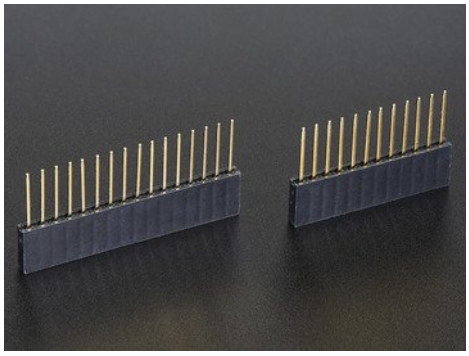
Assembly

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

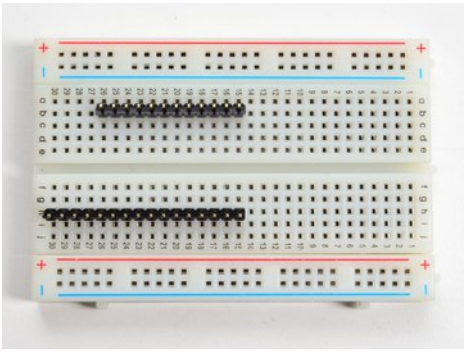
Header Options!

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

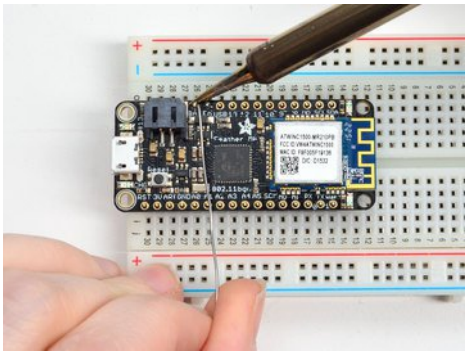
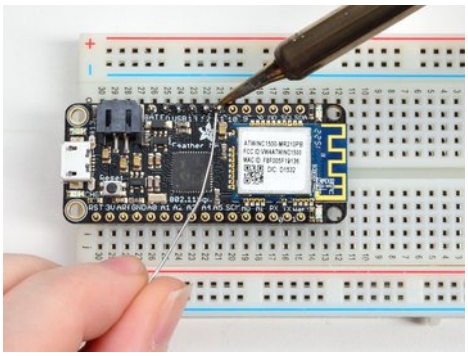
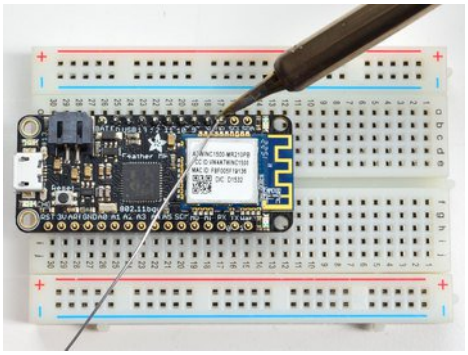
- 

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

- 
- 
- 

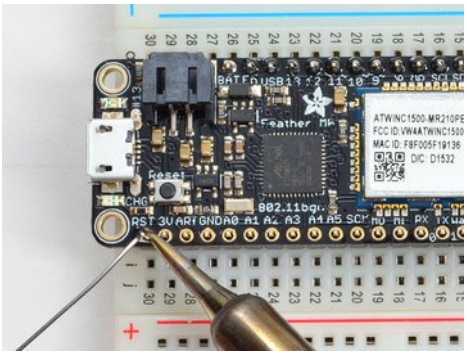
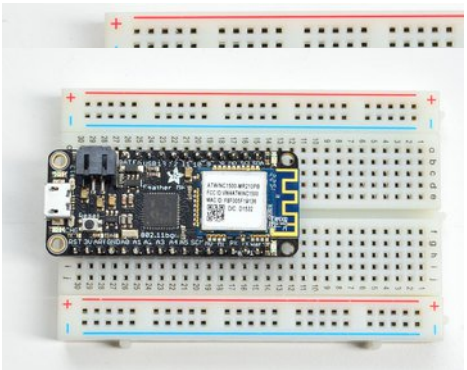
pads

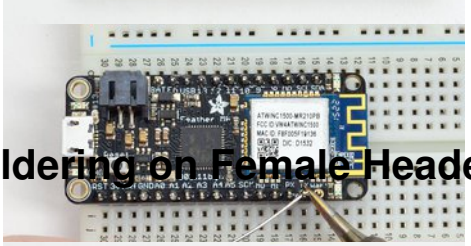
And Solder!

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)).

Solder the other strip as well.

- 
- 

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

Soldering on Female Header

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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