Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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Adabox 001

Created by lady ada

Last updated on 2017-01-20 08:53:04 PM UTC

Guide Contents

Introduction

Hi there!

If you're looking to buy AdaBox001 click here! (http://adafru.it/3193)

If you're looking to buy AdaBox002 click here! (http://adafru.it/3235)

If you're looking to subscribe to AdaBox, click here! (http://adafru.it/tNC)

If you're here, it's because you were given the gift of electronics with an AdaBox! You are a beginner who is getting started with your AdaBox or you just want to relive what it's like being a beginner at electronics again. But most of all, you want to learn how to build and make stuff with electronics! (If, rather than learn electronics, you'd like to look at pictures of cats instead, please check https://www.adafruit.com/galleries/cats-of-engineering (http://adafru.it/oAd))

And, you're in luck: there's *never* been a better time.

Gone are the days where you need thousands of dollars of equipment and lots physics/math background. Nowadays, if you want to learn to work with electronics, you can jump right in for $100 or less, and any sort of computer. And we're talking about learning *a lot* of electronics - from the basics of analog to the complexities of firmware. With a good pack of parts, you can build a base of knowledge that will take you from your first blinking LED to someone who can start prototyping and inventing custom products.

Who is this for?

Anyone with a computer they can install software on, an Arduino or compatible and the ability to type and click a mouse. That's pretty much the minimum. Remember, this guide is specifically for people who have purchased or received an AdaBox subscription!

You don't need to know a lot of physics or math, and just like an Art Degree isn't required for making art and being creative, **you *don't* need to have a computer science degree**. It helps if you're comfortable using computers but that's a skill most people pick up through life.

If you know how to program already - great! If not, don't worry, we'll teach you

enough to be dangerous.

Who isn't this for?

While you can follow along without an AdaBox, it will not make as much sense unless you have *all* of the components and more which either came as a gift or purchased yourself - remember, the goal is helping beginners!

If you're an expert, please visit our hundreds other tutorials and jump right in at learn.adafruit.com (http://adafru.it/rdw)

Who are you?

Great question. This is me:

I'm Ladyada, and I love to teach people how to build stuff and how they can be creative with technology.

So, are you ready?

Let's do this thing!

Unboxing Adabox 001

ADABOX 001 is designed to introduce a new person to the joys of making with electronics. We decided to come up with a fun pack of parts that:

- Could introduce a beginner to making
- Does not require any additional tools or paid software
- Teach electronics and programming skills
- Does not assume any prior experience
- Comes with enough fun parts that could be combined and adapted for months or *years!*

Kit Contents

After a lot of thinking, here's what we came up with:

Feather, USB Cable & Battery

- 1 x Adafruit Feather 32u4 Adalogger (http://adafru.it/2795) (fully assembled with stacking headers) - This Arduino-compatible microcontroller board is a tried and true platform. There's hundreds (if not thousands!) of Arduino tutorials that you can follow once you have completed the ADABOX project tutorials. It plugs into a breadboard for storage and prototyping.
- 1 x Micro USB Cable (http://adafru.it/592) - use this to install new code onto your Feather (from any computer) - and to recharge the Feather's battery for portable projects!
- 1 x Lithium Polymer Battery (http://adafru.it/1578) - this rechargeable battery can be used to make your Feather project portable. Plug it into the Feather to have it automatically charge over USB. When removed from USB power, the Feather will automatically flip over to battery power.

Prototyping tools

- 1 x Full size Breadboard (http://adafru.it/239) - this is your artistic canvas! It holds your Feather board securely and also lets you plug in other parts and connect them with the jumper wires for infinitely reconfigurable works-of-electronic-art
- 20 x Short Jumper Wires (http://adafru.it/1956) & 20 x Long Jumper Wires

(http://adafru.it/1957)- use these to connect parts on your breadboard. You can peel off the individual wires as you need the. You'll get 2 of each in 10 colors and 2 lengths

LEDs, Buttons and Components

- 1 x 10mm Red (http://adafru.it/845) & 1 x 10mm Green (http://adafru.it/844) & 1 x 10mm Blue (http://adafru.it/847) LEDs - use these to create lights that you can blink, pulse or mix for lovely lightshows
- 1 x RGB LED (http://adafru.it/302) - this is a compact version that contains red + green + blue in one 'package' for a compact colorful light
- 3 x 12mm Push Buttons (http://adafru.it/1119) - plug these into the breadboard and wire them to your Feather to create finger-friendly inputs.
- 5 x 10KΩ resistors (http://adafru.it/2784) (Brown Black Orange Gold stripes) - resistors help you control the flow of electricity. The 10KΩ is the workhorse of resistors, used for almost anything! We'll have this resistor for use as a sensor assistant (as a pullup or pull-down)
- 5 x 560Ω resistors (http://adafru.it/2781) (Green Blue Brown Gold stripes) - These smaller resistors have only about 1/20th of the resistance of the 10K's but they're great for lighting up LEDs!
- 1 x 1uF capacitor & 0.1uF capacitor - These components are used to store and smooth out small bursts of current.

Sensors

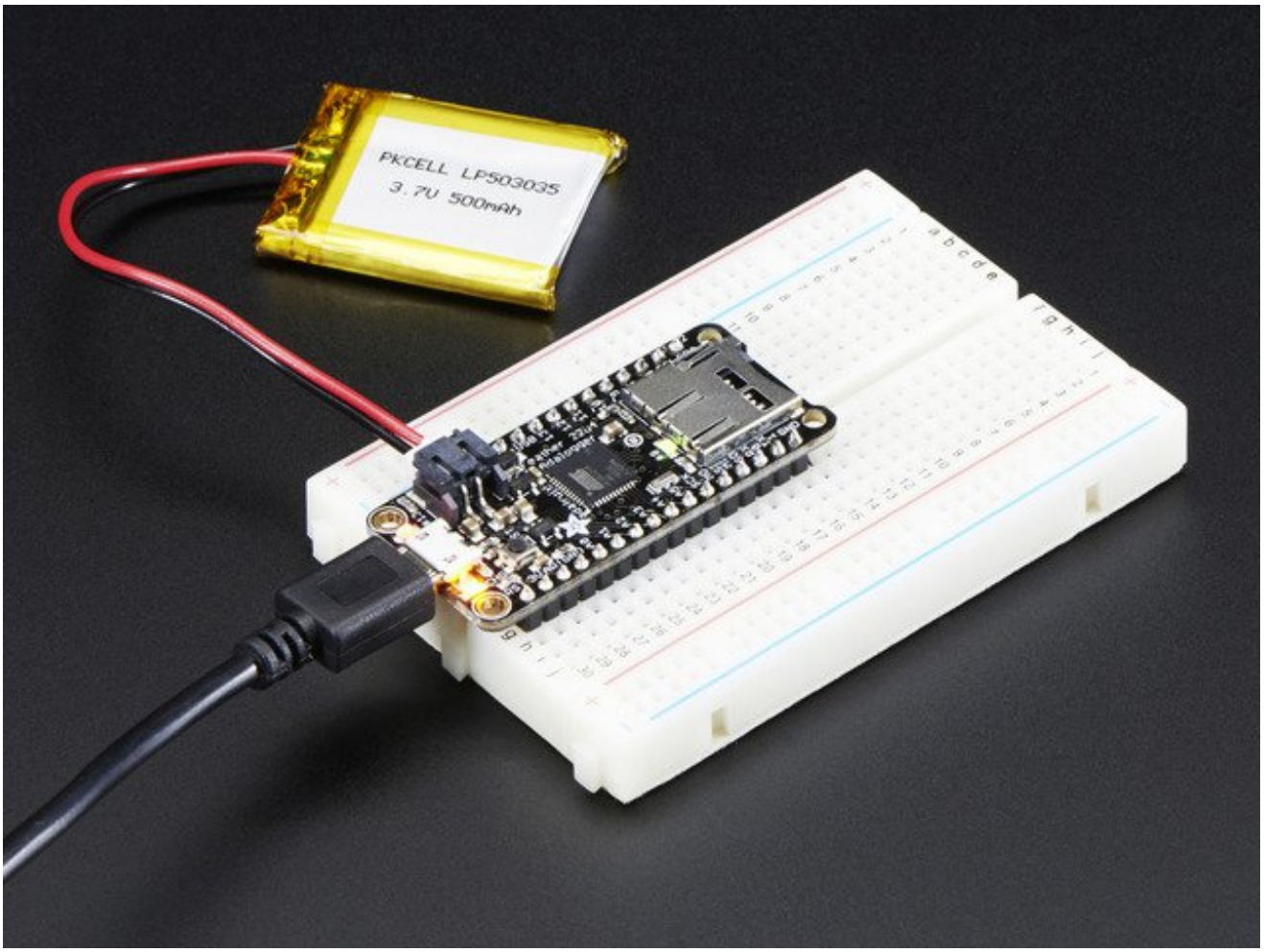
- 2 x 10K Mini Breadboard-Friendly Potentiometers (http://adafru.it/356) - These are *adjustable* resistors. Use them as twistable sensors or as a way to vary a voltage or resistance.
- 1 x CdS Photocell Light Sensor (http://adafru.it/161) - This is a very unique kind of resistor. As you shine a light on it, the resistance value goes *down*. You can use this to sense light and dark.
- 1 x Flex Sensor (http://adafru.it/1070) - This is *also* a kind of resistor. As you may be able to guess, when you *bend* the flexible part, the resistance changes. so you can use it to detect touch and motion.
- 1 x Temperature Sensor (http://adafru.it/165) - This sensor is a little different - it isn't a resistor type. It's a little more complex than that, but it will generate an analog reading that can be converted to the temperature.

Buzzer & Displays

- 1 x Piezo Buzzer (http://adafru.it/160) - Your feather can make cute little beeps and boops with this buzzer. Good for making sounds, songs and notifications.

- 1 x 16x2 LCD (blue and white) (http://adafru.it/1447) - Display text messages on this backlit display. You get 16 characters and two rows for showing information
- 1 x Assembled Neopixel FeatherWing (http://adafru.it/2945) - plug it on top of your Feather for 32 full color LEDs in a 4x8 grid. Great for lighting effects with tons of colors

Feather 32u4 Adalogger

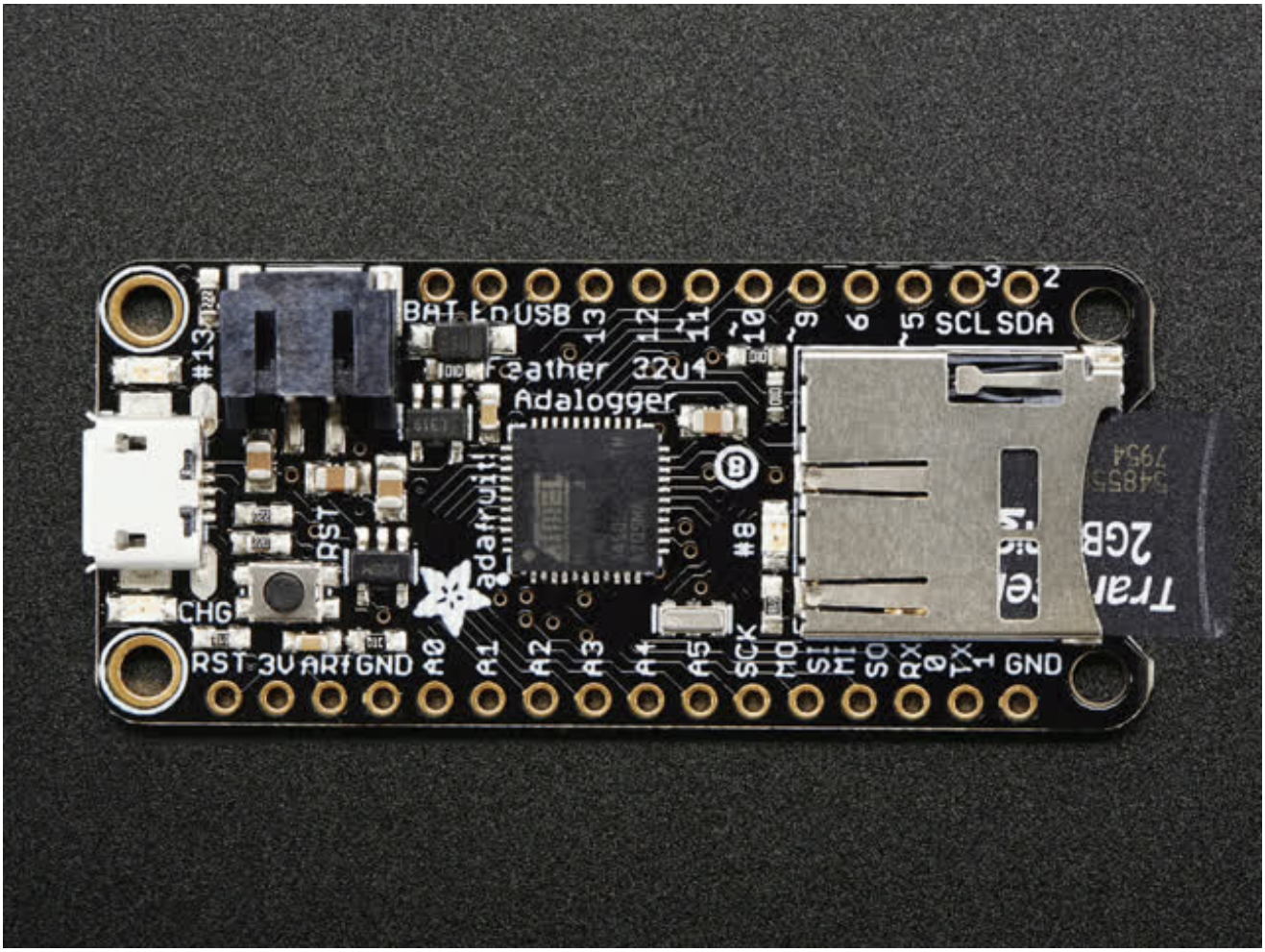


If you want to learn electronics these days, it's not enough to build a lamp or crystal radio. All the most interesting projects require "physical computing" skills. That's the ability to write code on a *microcontroller* using your computer (computing) and then connecting up LEDs, sensors, and displays (the physical stuff) to build a unique creation.

To make AdaBox more fun than just an everyday Arduino-based kit, we decided to include our new microcontroller board the Feather 32u4. Feather 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. It's Arduino compatible but it's breadboard-friendly, portable, and has a lot of extra goodies built in.

We even upgraded from the basic Feather 32u4 we sell to the**Adafruit Feather 32u4 Adalogger.** This microcontroller board is 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!



Technical Specifications

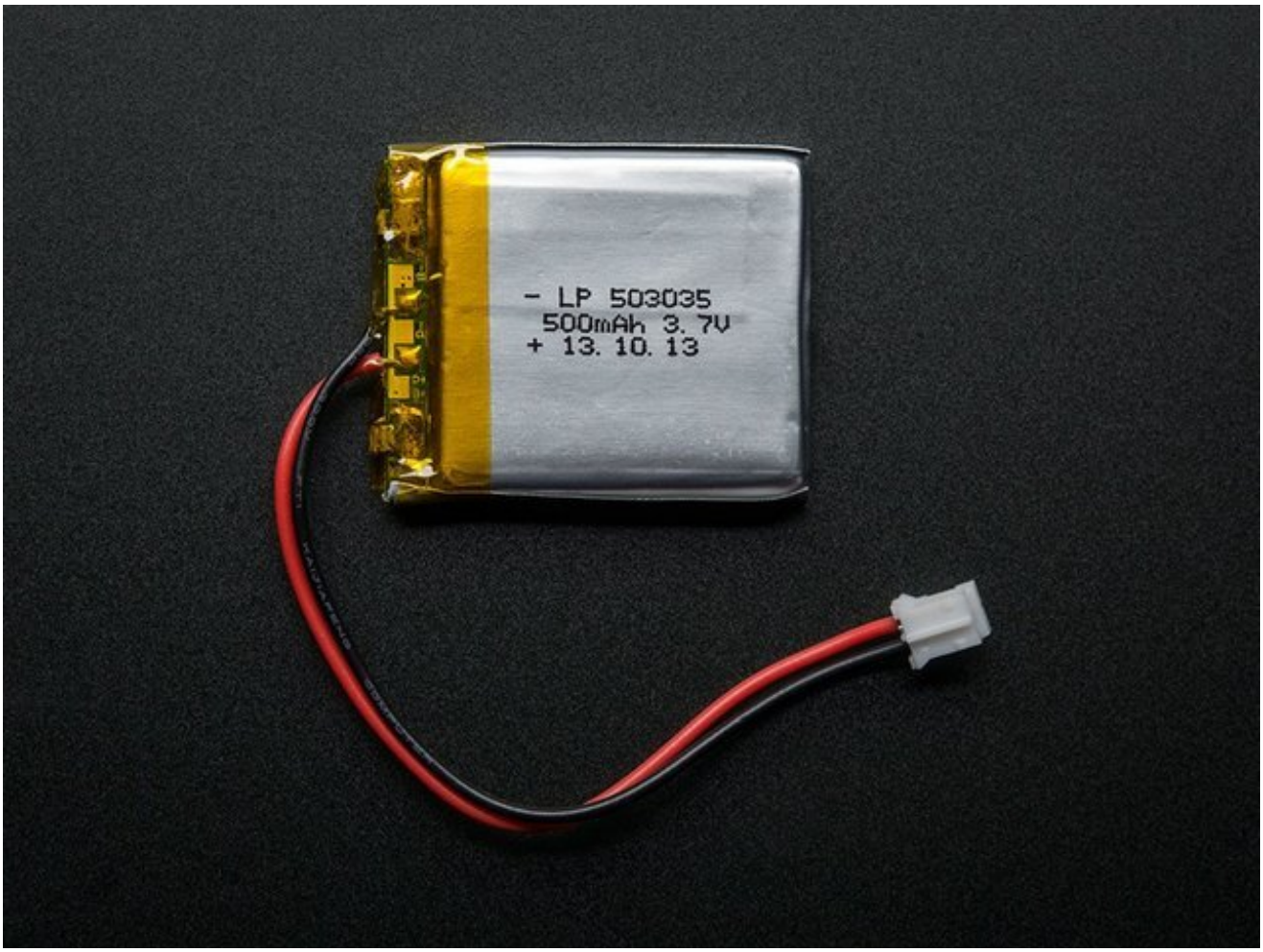
At the Feather 32u4's heart is at ATmega32u4 clocked at 8 MHz and at 3.3V logic, a chip setup we've had tons of experience with as [it's the same as the Flora](http://adafru.it/dVl). This chip has 32K of flash and 2K of RAM, with built in USB so not only does it have a USB-to-Serial program & debug capability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

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

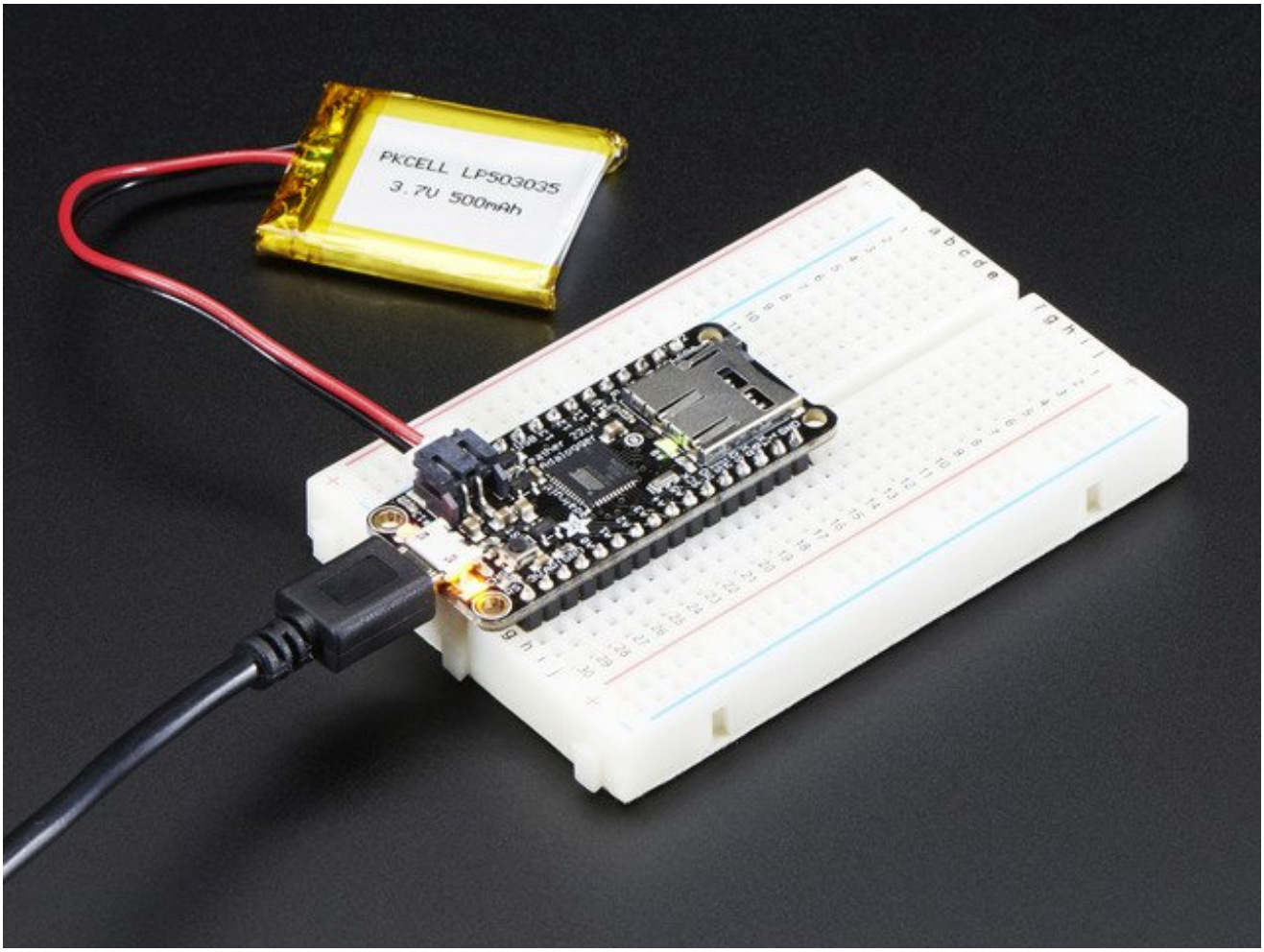
- USB native support, comes with USB bootloader and serial port debugging
- You also get tons of pins - 20 GPIO pins
- Hardware Serial, hardware I2C, hardware SPI support
- 8 x PWM pins
- 10 x analog inputs
- Built in 100mA lipoly charger with charging status indicator LED
- Pin #13 red LED for general purpose blinking
- Pin #8 green LED for more blinking pleasure
- Power/enable pin
- 4 mounting holes
- Reset button
- MicroSD card holder for adding as much storage as you could possibly want, for reading or writing data

Lithium Polymer Battery



Lithium ion polymer (also known as 'lipo' or 'lipoly') batteries are thin, light and powerful. The output ranges from 4.2V when completely charged to 3.7V. This battery has a capacity of 500mAh for a total of about 1.9 Wh.

The batteries come pre-attached with a genuine 2-pin JST-PH connector as shown and include the necessary protection circuitry. So you can plug it right into your Feather, using the little port on the side. It will only plug in one way.



If the battery is plugged into the Feather and the USB cable is connected to a computer or power supply it will automatically recharge the battery. The yellow LED will light up to let you know. When the yellow light turns off, the battery is done charging

The battery will run most projects for 5-10 hours (depending on what is attached) and recharges in about 5 hours.

Safety Notes!

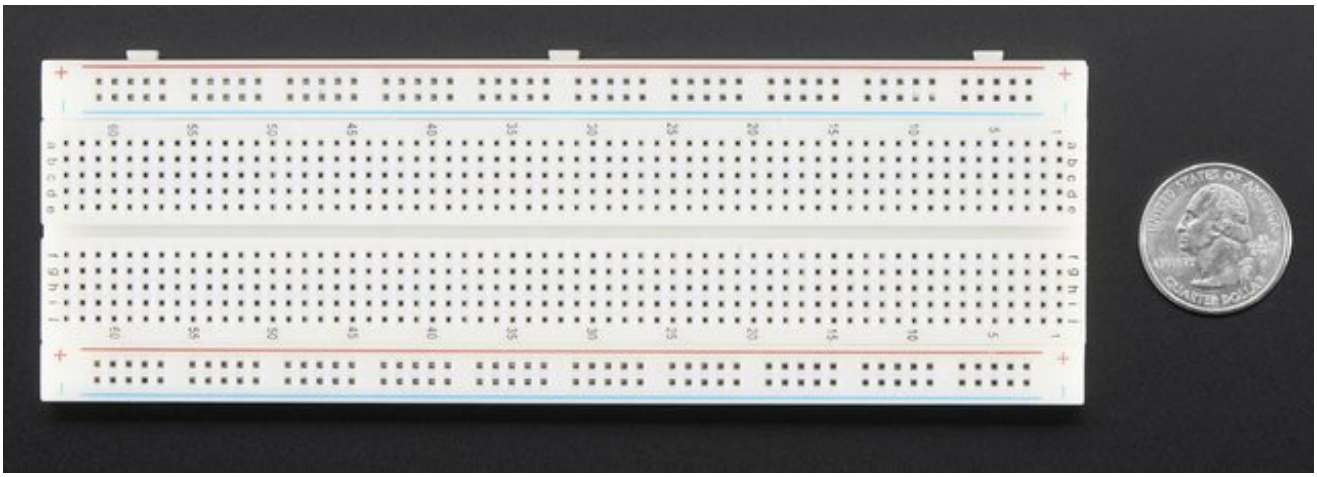
The included protection circuitry keeps the battery voltage from going too high (over-charging) or low (over-use) which means that the battery will cut-out when completely dead at 3.0V. It will also protect against output shorts. However, even with this protection **it is very important that you only use a LiIon/LiPoly constant-voltage/constant-current charger (like the one built into the Feather) to recharge it!**

Additional safety notes: Do not use a NiMH/NiCad/lead-acid charger! Also, do not abuse these batteries, do not short, bend, crush or puncture. **Never charge or use unattended.**

Always inspect batteries and surrounding circuitry constantly for any damage, loose wiring, or possibility of short circuits. As with all Lithium ion polymer batteries and with any power source - they should be used by experts who are comfortable working with power supplies.

The Li Poly battery is *not* required for any projects - if you prefer not to use the battery simply dispose it at your local battery recycling/disposal center.

Breadboard

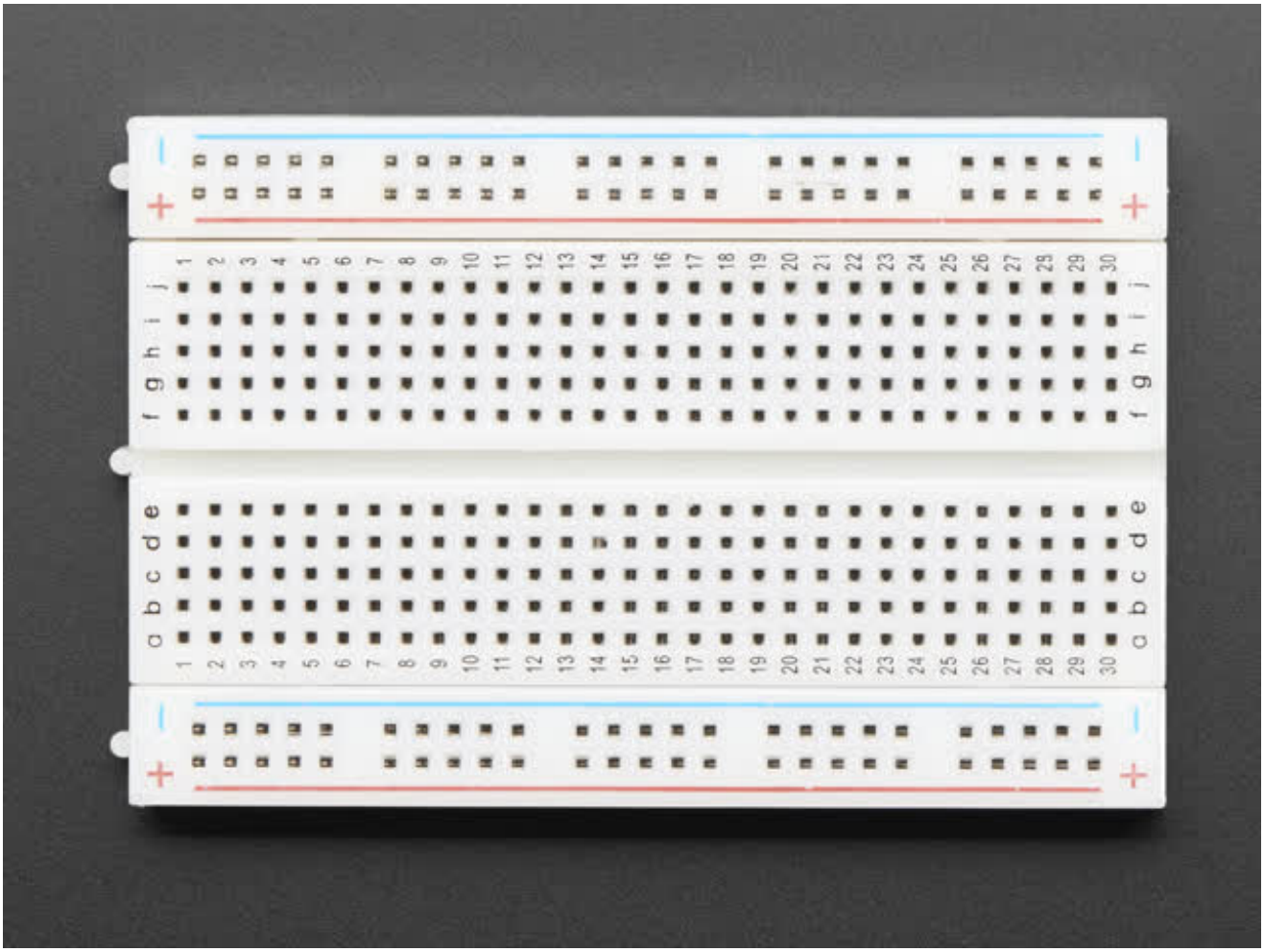


These "Solder-less" Breadboards are incredibly handy for building circuits. They are durable and reusable and have tons of work space. They not only hold your parts steady, a breadboard also has *internal wiring* to make connections super fast.

We've made a lovely video starring Collin, taking you on a journey to understand breadboards and their usage! You can watch it before, after or during reading the rest of the guide.

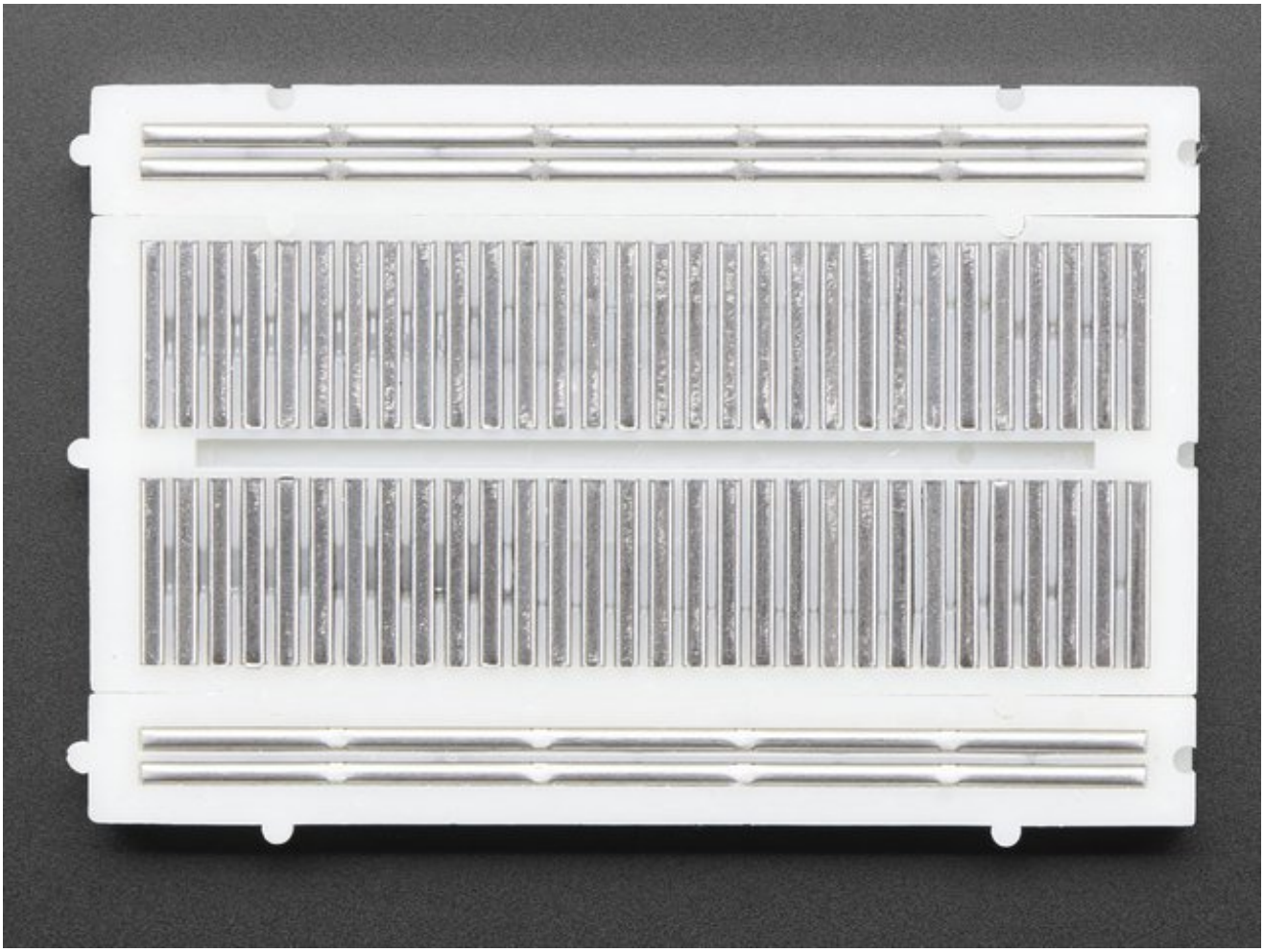
Breadboards make look like just a slab of plastic, but there are secrets hidden deep inside!

Here's an "X-Ray" of a breadboard:

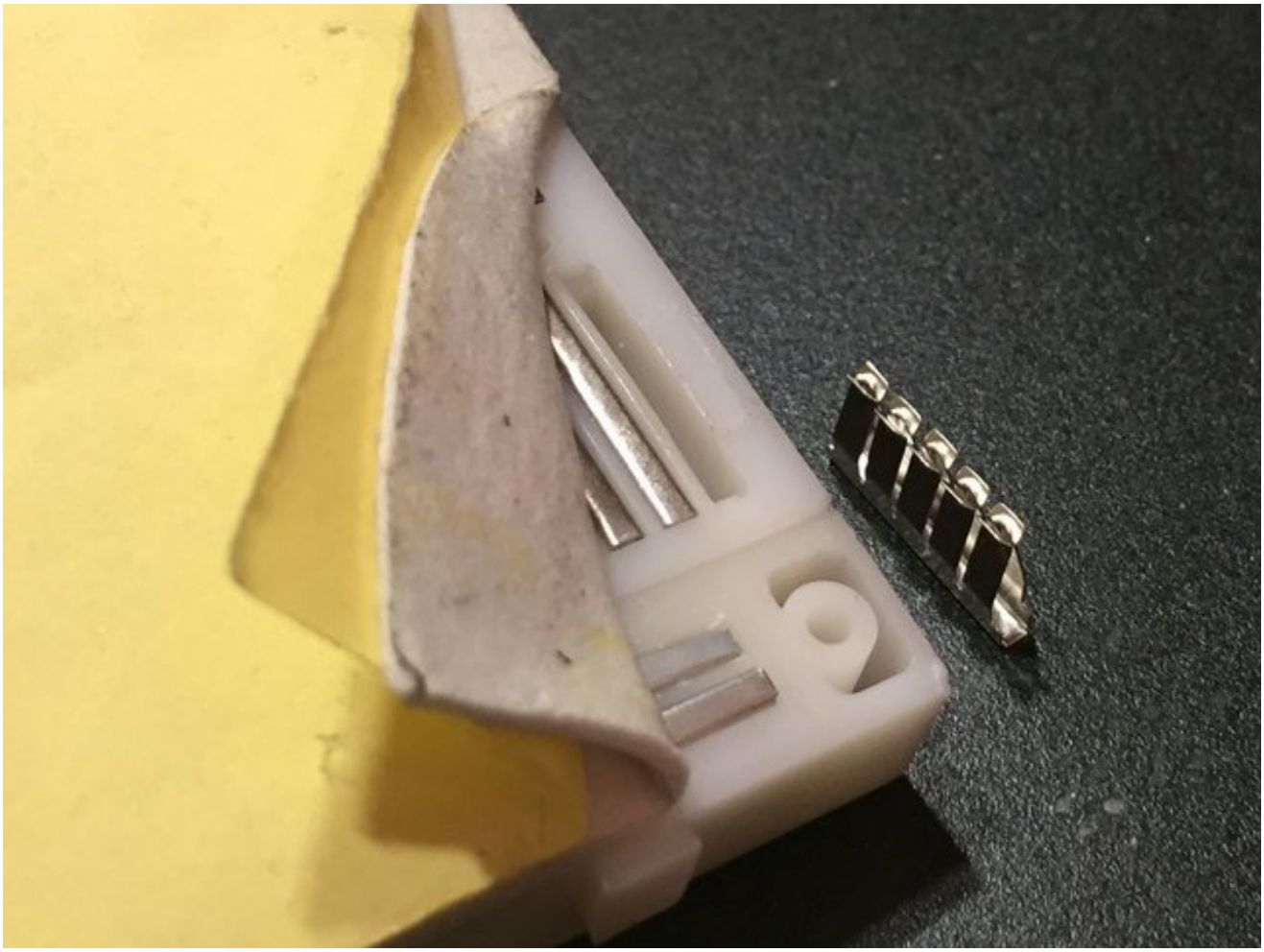


If you look on the back of your breadboard, there's a yellow waxy paper covering some sticky foam. If you were to peel back that foam you'd see dozens of these metal rows.

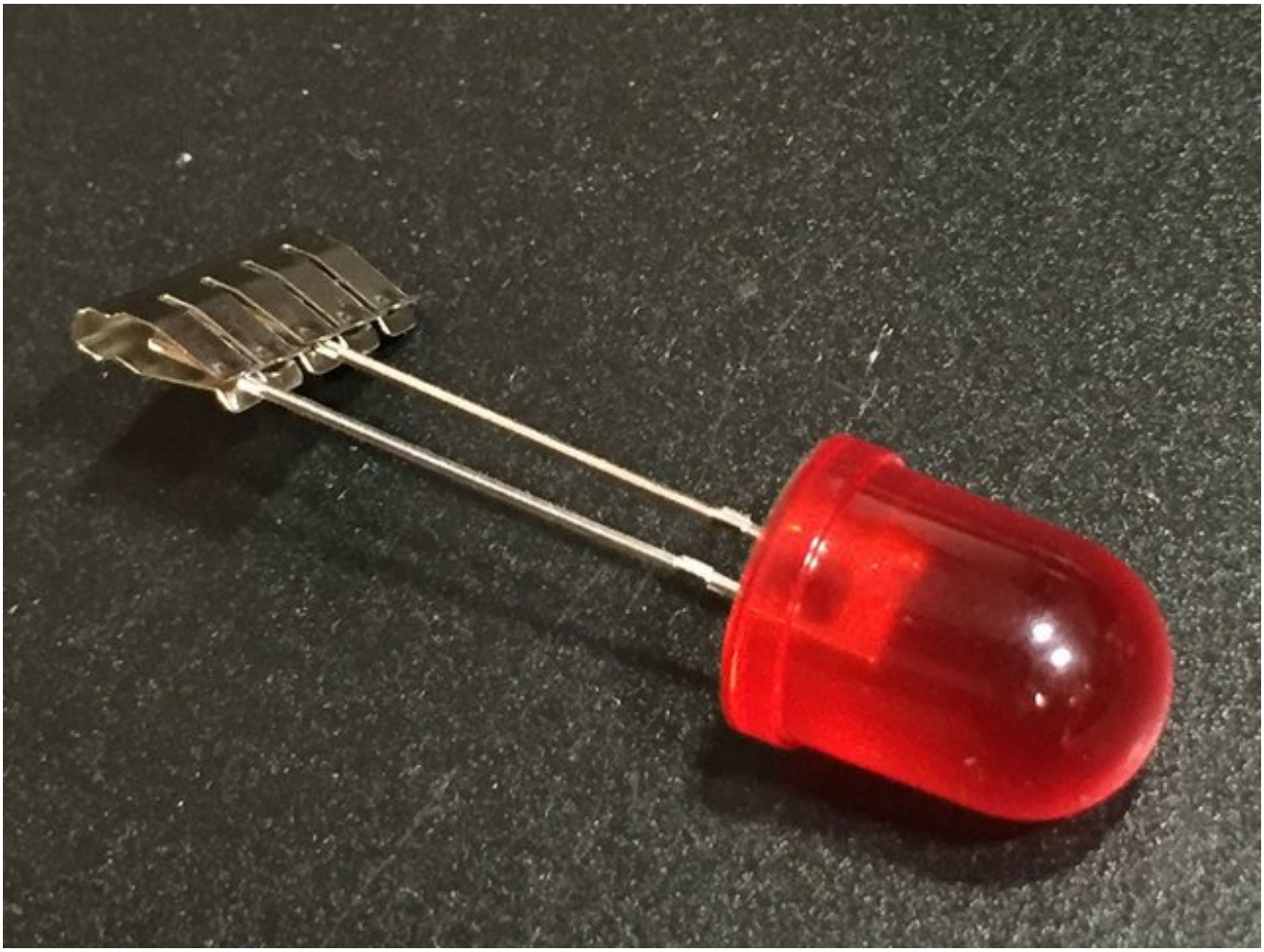
(Don't actually do this, you should keep the yellow paper on your breadboard, we'll sacrifice this one for some photos!)



If you pulled the metal parts out with pliers (again, don't do this yourself!) You'd see each one is a metal clip with little teeth. The rows have 5 teeth - one for each hole on the top of the breadboard. (The power rails have 50 teeth)



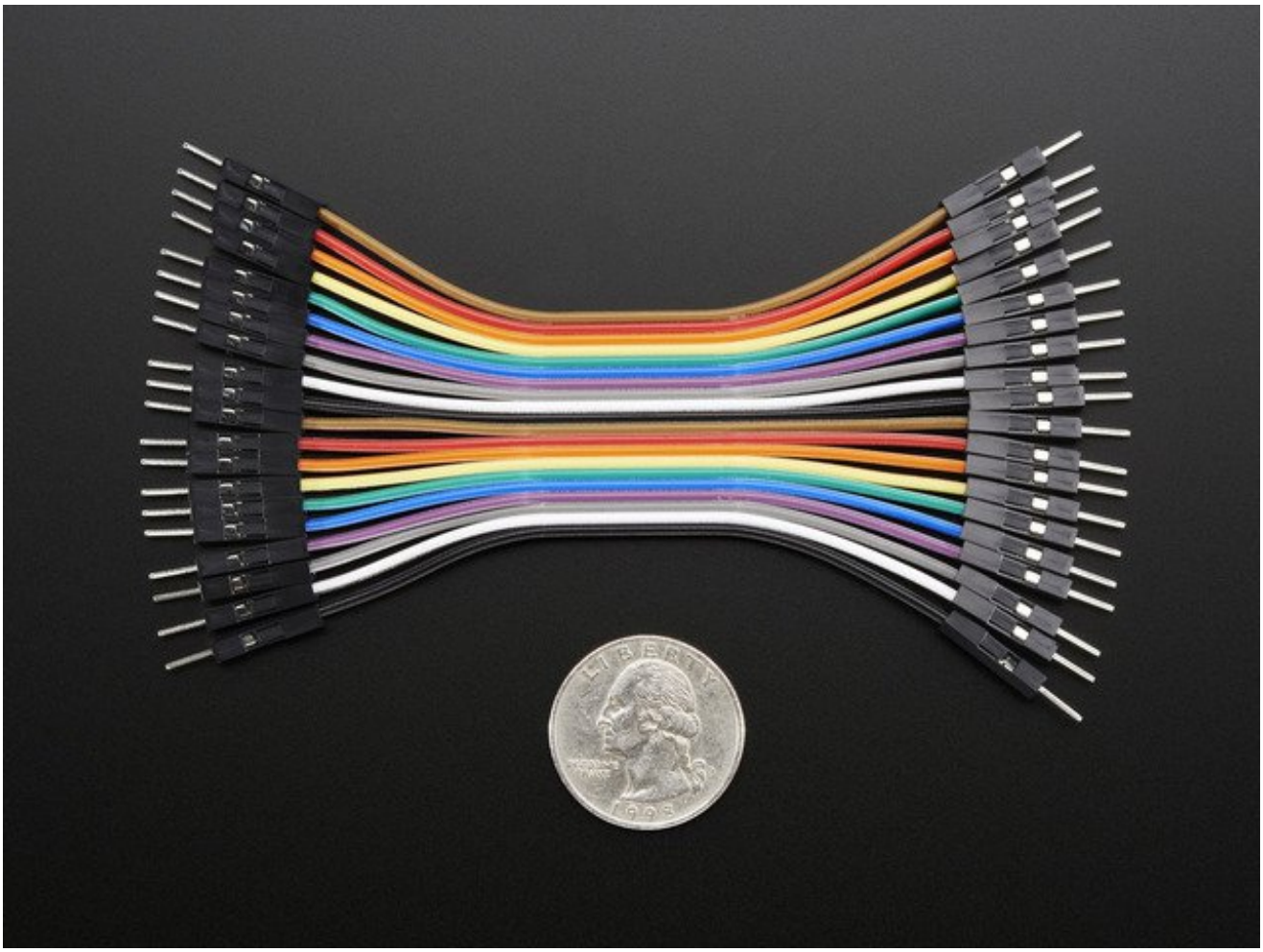
These little teeth are great at gripping onto electronic parts. When a part is pushed into the breadboard, the clip pushes open and grabs onto the metal leg. Any other parts that are plugged into the other 4 teeth are thus electrically connected together



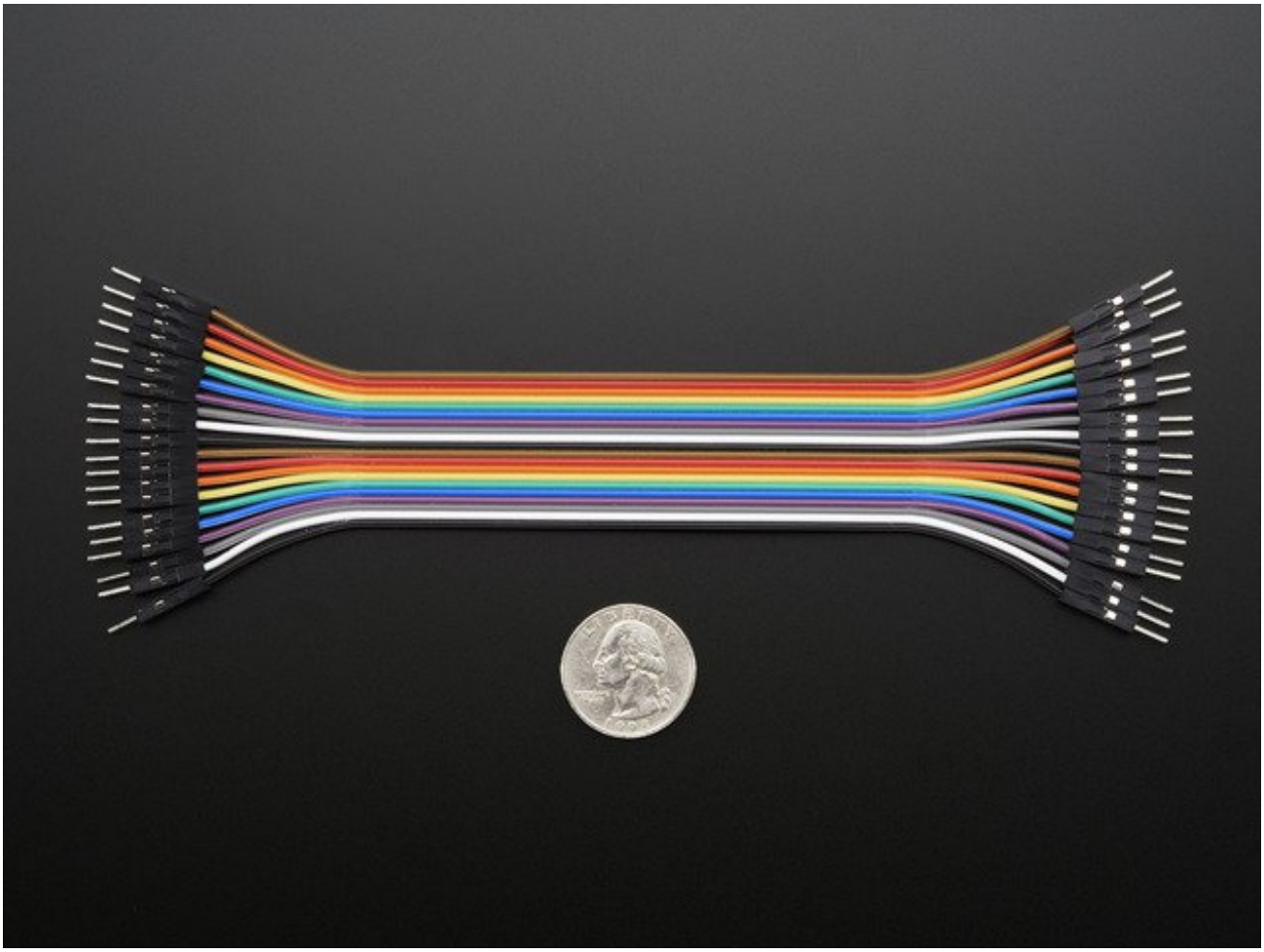
Each clip can handle at least a hundred plugs and unplugs before the springiness of the clip slowly weakens and eventually stops gripping so well. You'll know when the breadboard needs replacing because you wont feel the clip gripping onto the part when you press it in.

However, this takes *years* to happen. Even if you did have to replace it, breadboards are quite affordable. Most makers have a half dozen different sizes for projects, sometimes dedicating each one to a 'long term' project and keeping one for playing around.

Jumper Wires

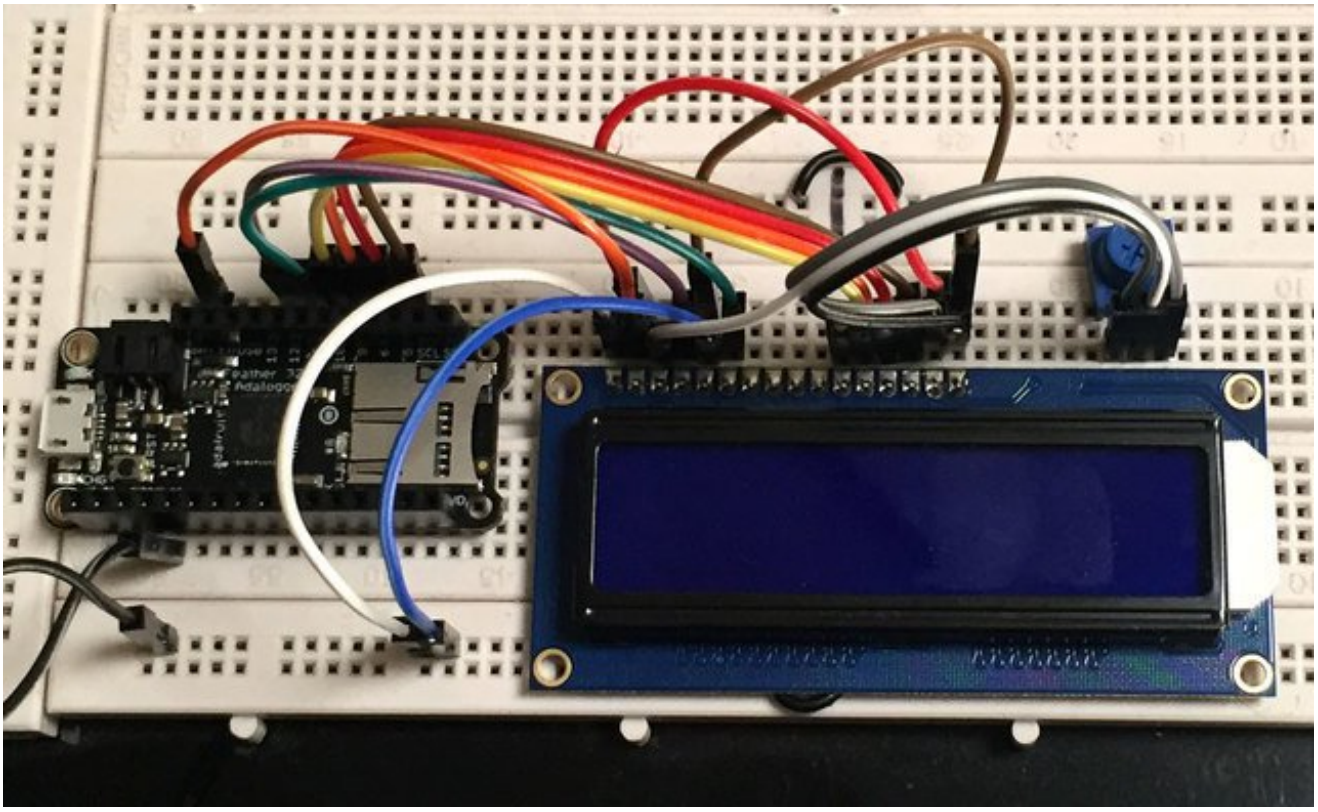


To take full advantage of your breadboard, you'll need to have plenty of wires that can*jump* between the holes and make electrical connections. These bundles of premium wires come in two lengths, about 3" (75mm) and about 6" (150mm). The lengths aren't exact but between the two you'll have plenty of short and long options.



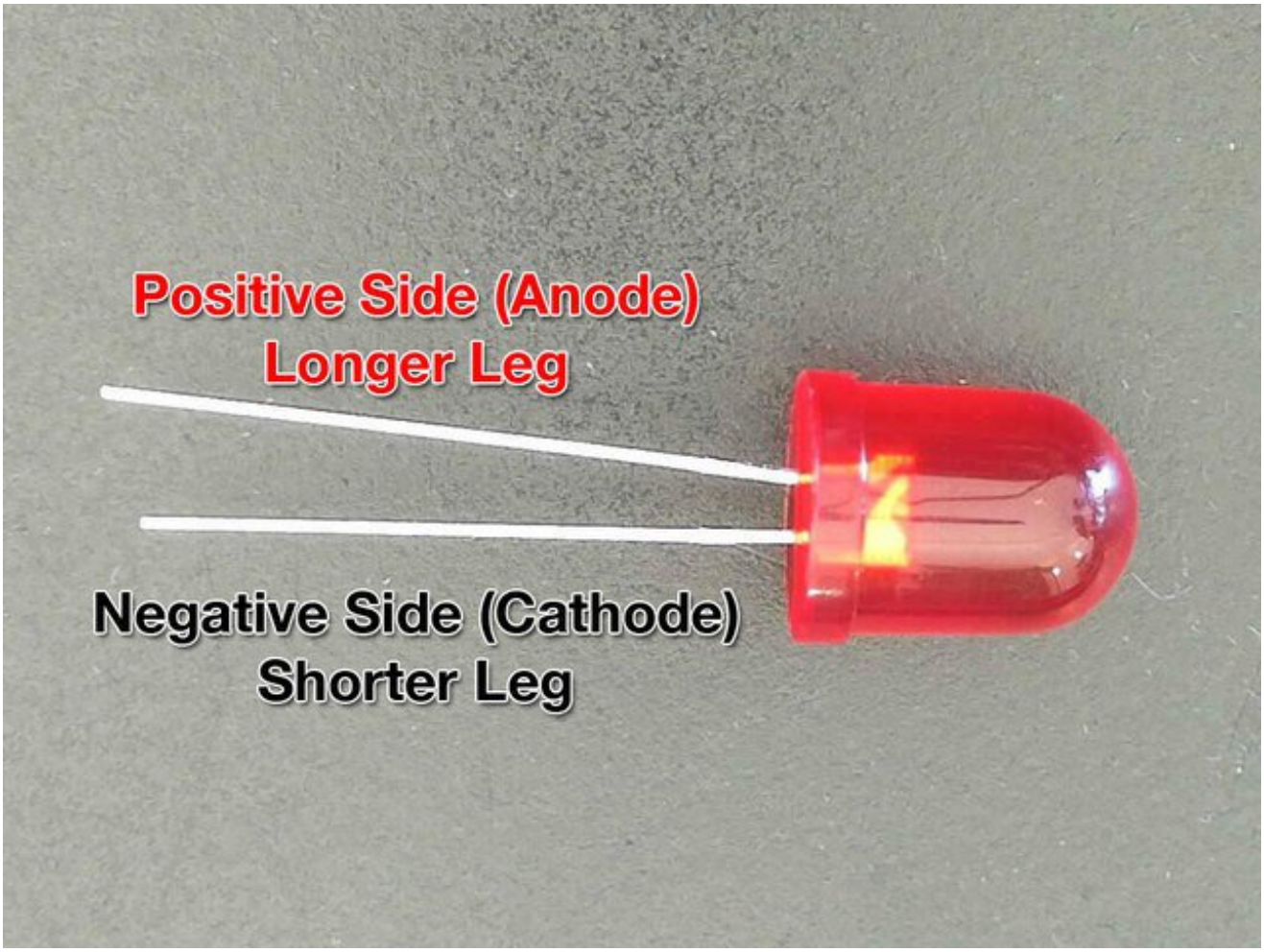
Each version comes in a 'strip' of 20 (2 pieces of each of ten rainbow colors). They have 0.1" male header contacts on either end and fit cleanly next to each other on standard-pitch 0.1" (2.54mm) breadboards. The best part is they come in a 20-pin ribbon cable. You can always pull the ribbon wires off to make individual jumpers, or keep them together to make neatly organized wire harnesses.

Here's an example of a fairly complex wiring setup possible with the jumpers. Note that some wires are indiviual and some, like the brown/red/orange/yellow set are still together to make the wiring a little neater.

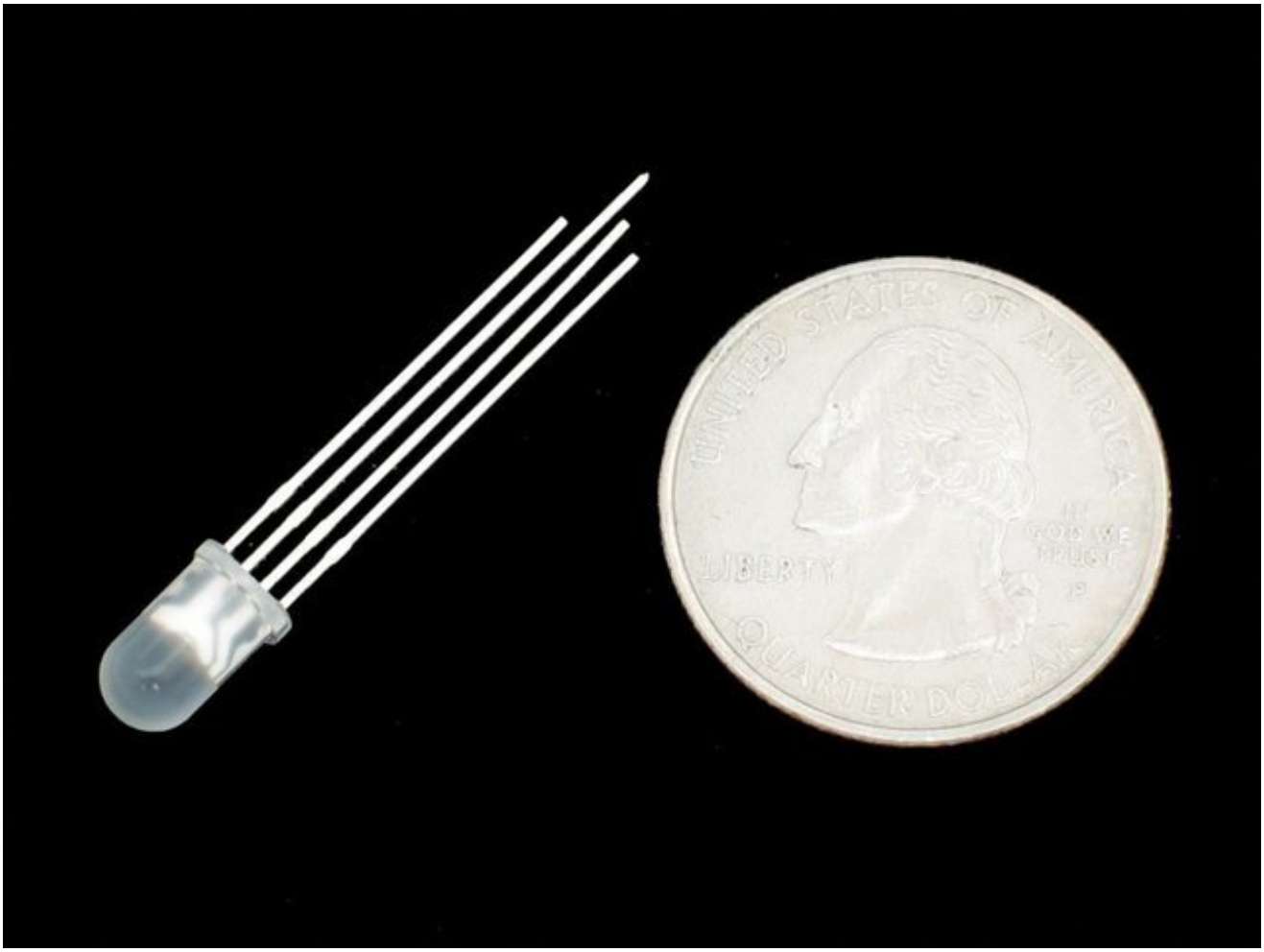


LEDs

Bright lights, big fun! Your kit comes with a variety of LEDs. For individual LED fun, you'll get one each of Red, Green and Blue in 10mm diameter size. These look like jellybeans but they're not for eating! You can use your Feather to light up each one in the respective color. They look great and you can see them from far away.



You'll also get a single **RGB** LED - this special LED is like a smoothie made from the three individual LEDs above! You get one plastic package but with a very very tiny Red Green and Blue LED *inside*.



Since the LED is all in one, you can vary the brightness of each color to create swirls of infinite color mixtures. It's like mixing paints but you're using *light*