

Halloween Hacks: Ballerina Clyde

Monday, October 20, 2014



Twinkle toes Clyde slips on 6 blinky RGB LED slippers and tutu to pirouette All Hallows' Eve. Learn how in this step-by-step tutorial.

Overview

Summary

In this tutorial you'll learn how to add RGB LEDs to Clyde's feet. The opening on the foot end of Clyde's leg is designed to fit one 5mm LED, and his legs are hollow. So basically Clyde is just begging for new twinkling slippers! Clyde's main board has solder pads, labelled LED Ext, that allow you to add additional RGB LEDs using the same pins as the eye light. You'll have to solder the header pins onto these pads to use them. Once you do, you'll be able to match Clyde's feet color to his eyes.

This tutorial is presented in three steps (four, if you count tutu-making). You'll start by soldering pin headers to the LED Ext solder pads. Next, string wires through Clyde's legs and then solder a RGB led to the foot end. In the final step, you'll build the simple circuit and wire the LEDs to the LED Ext pin headers. As a finishing touch, you can make Clyde a little tulle tutu to complete the ballerina look. Let's get started!

The Steps

- Step 1: [Solder the header pins to LED Ext solder pads](#)
- Step 2: [Add the RGB LEDs to Clyde's legs](#)
- Step 3: [Build the circuit](#)
- Step 4: [DIY No Sew Tutu](#)

What you'll need

Clyde
 6 Common Anode RGB LEDs, <http://www.adafruit.com/products/159>
 390 ohm through hole resistors, orange-white-brown-gold
 470 ohm through hole resistors, yellow-violet-brown-gold



Clyde is currently sold out, but the next improved litter is on the way!

PRE-ORDER CLYDE V2 FROM \$135

[Learn more about Clyde](#)

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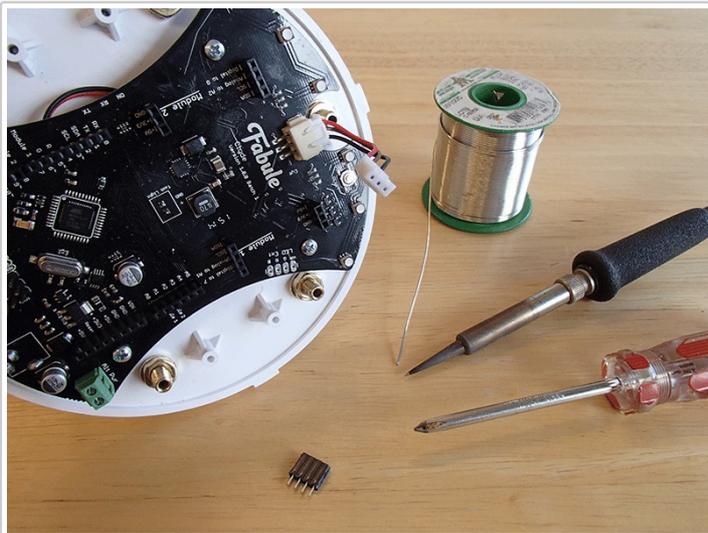
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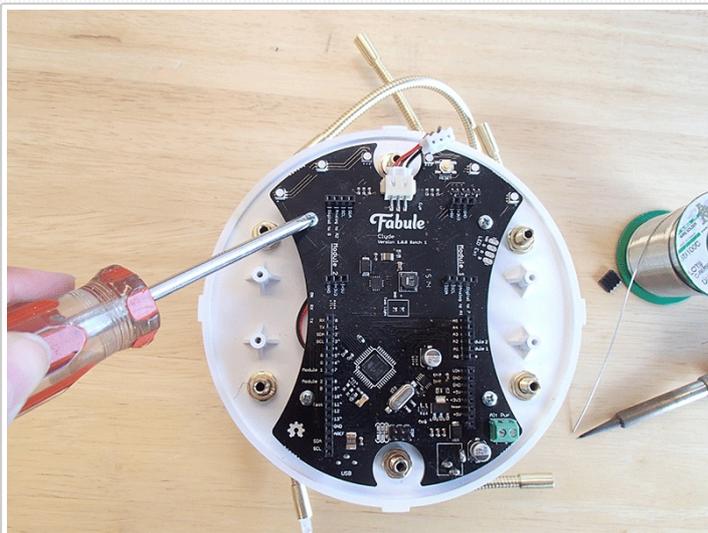
Half-size breadboard, <http://www.adafruit.com/products/64>
4 pin headers, <http://www.adafruit.com/products/598>
32 male-to-male jumper wires, <http://www.adafruit.com/products/1956>
24-26 AWG wire or smaller, 4 wires in 6 legs = 24 wires of about 17 inches each = **34 feet of wire**.
Heat shrink tubing, as small as you can get
Phillips head screwdriver
Soldering iron
Solder
A piece of Tulle, for the tutu
A piece of ribbon, for the tutu

Step 1: Solder the header pins to LED Ext solder pads

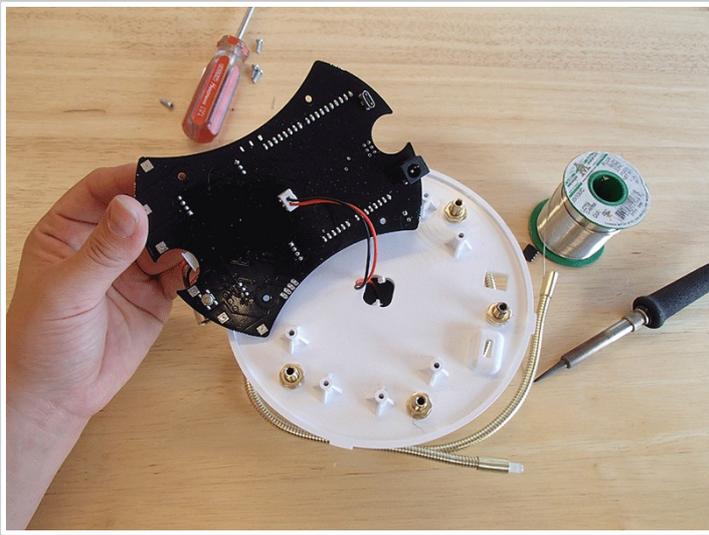
What you'll need for step 1: solder, soldering iron, pin headers, and a Phillips head screwdriver.



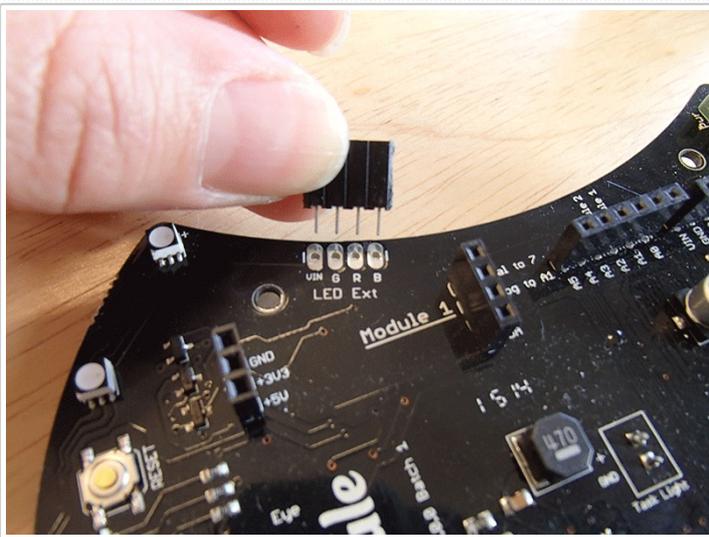
Unscrew the board from the enclosure.



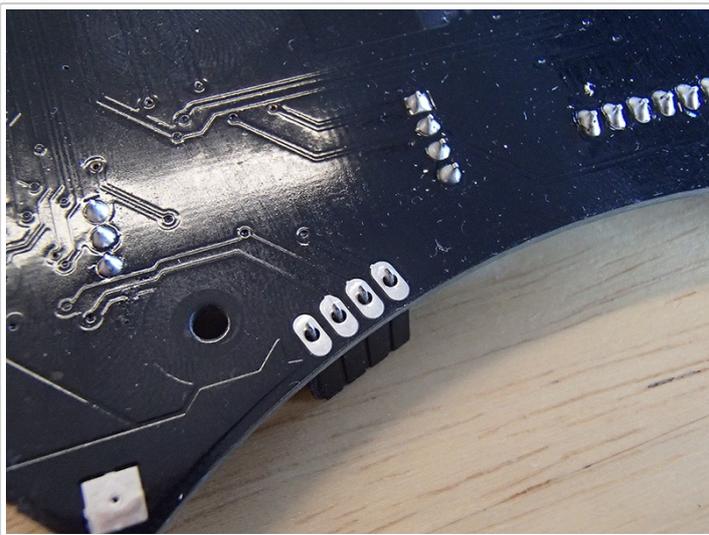
Carefully unplug the task light from the board.



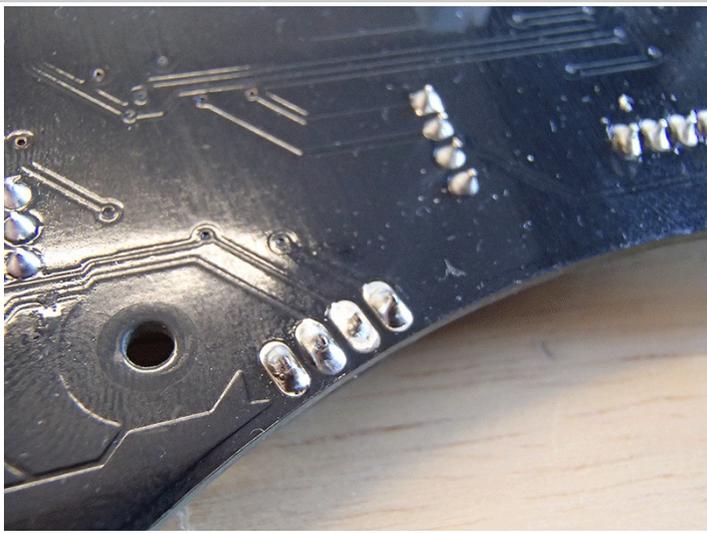
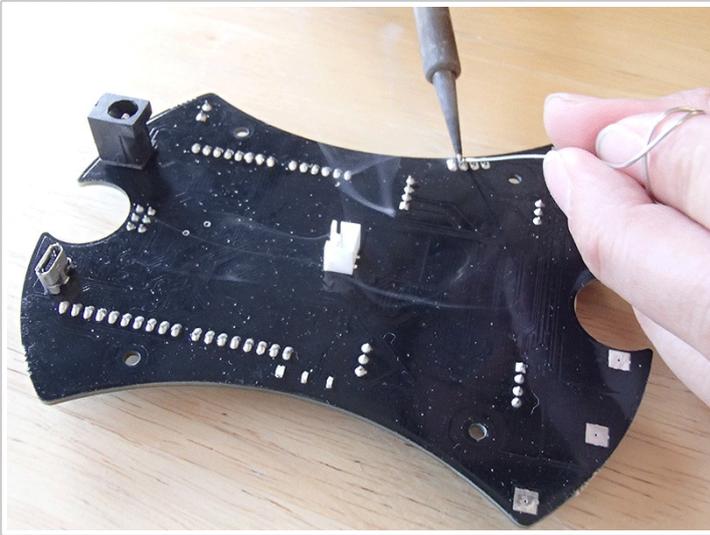
Place the pin headers in the LED Ext solder pad holes.



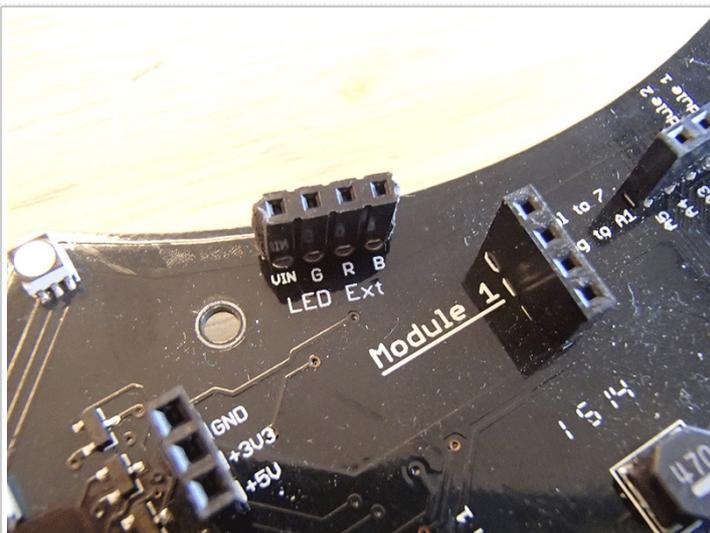
Flip the board over, carefully holding the pin headers in place.



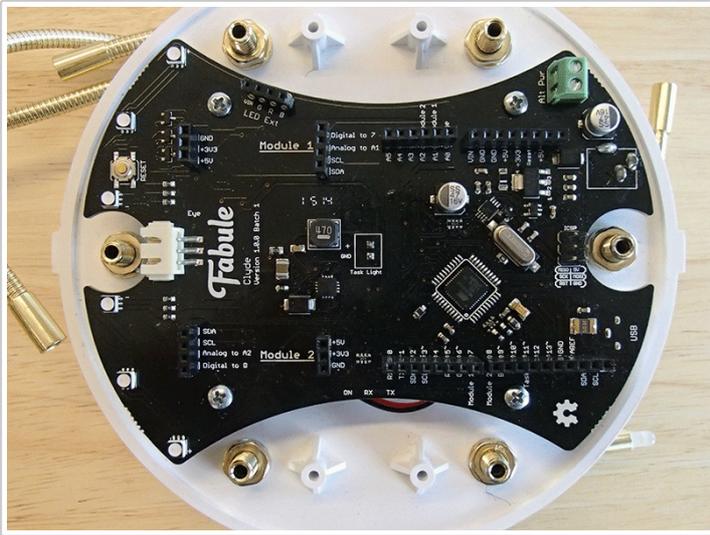
Solder the pin headers to the board. If you need some help with soldering, check out [Sparkfun's How to Solder Tutorial](#)



Flip the board back over. Looks good!



Plug in the task light into the bottom of the board and screw the board back onto the enclosure. You have completed step 1! Well done.



Step 2: Add the RGB LEDs to Clyde's legs

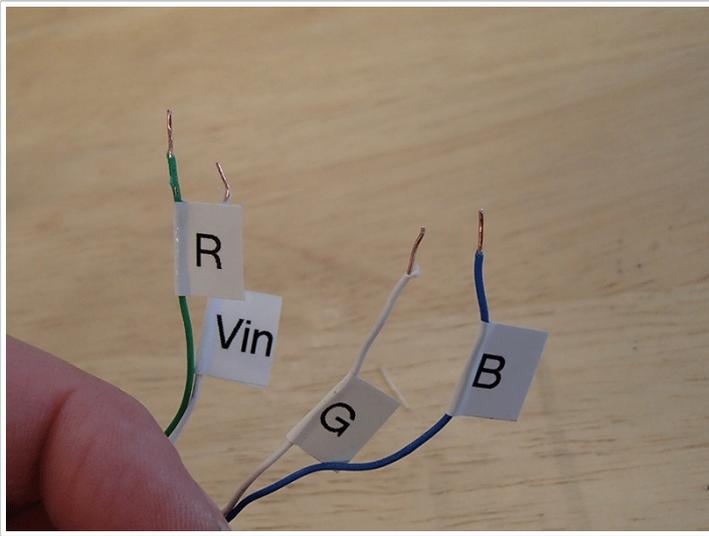
Grab four 17 inch lengths of wire. Use four different color wires, or find a way to distinguish each wire on each end. Nail polish would work nicely. I used about 5 feet of [category 6 ethernet cable](#) and separated the wires.



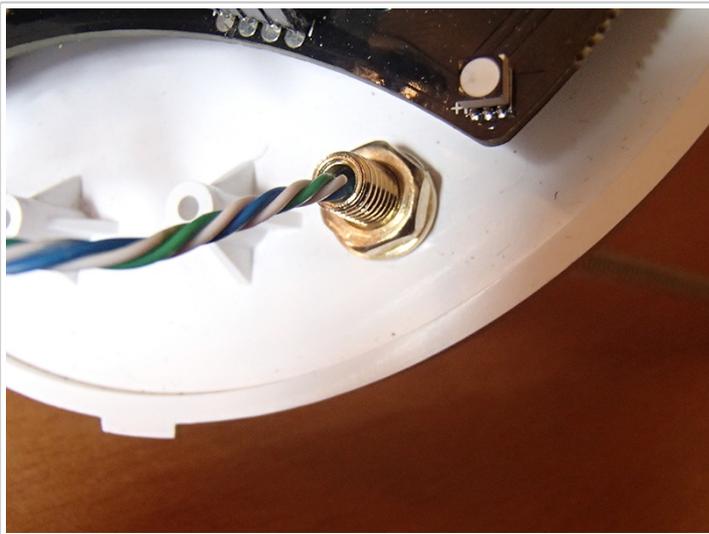
Wind the four wires together tightly. This number of wires just barely fits in Clyde's legs, so there is no room to spare. You do not want the wires bunched up anywhere, so make sure to keep them under tension as you are twisting the wires together.



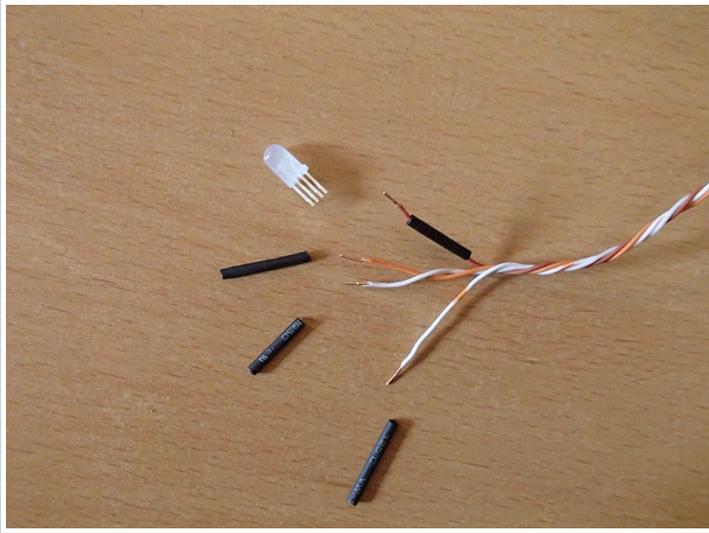
Label the end of the wires that will be inside Clyde's head.



Push the 4 twisted wires into Clyde's leg. It can be challenging, the wires can get stuck in the leg. I found one technique that helped me string the wires through the leg. Attach a small nail to a piece of detail floss and drop it through Clyde's leg. I recommend starting at the foot end of the leg and dropping the nail towards Clyde's body. Unattach the nail, clipping it with a pair of scissors is easiest way. Wind the floss into the wrap of wires. Lead the wire through the leg by gently pulling the floss from the foot end and pushing the wire down the leg.



Once the wire is all the way through the leg, untwist the wires on the foot end. Slip a small section of heat shrink tubing onto each wire. Clip the leads of the led short. Make sure you know which lead is which. The long leg is the cathode, flat edge of the LED is the red lead side.



Solder the wires to the led. You would benefit from using a [helping hand](#). If you need some help with soldering, check out [Sparkfun's How to Solder Tutorial](#). I splayed the leads out to give a bit more working space. I soldered one lead to one wire, covered the connection with the tubing, shrunk the tubing and then moved onto the next lead. Once all 4 leads are soldered to wires, bend the leads back into close together. Work very neat and tidy so that the connection can fit into Clyde's leg. Take your time.

Once the LED's leads are neatly together, make sure that metal from one lead connection is not touching another lead. You could even jump ahead to the section 3, build the circuit for one LED and test to make sure it works before moving to the next leg.



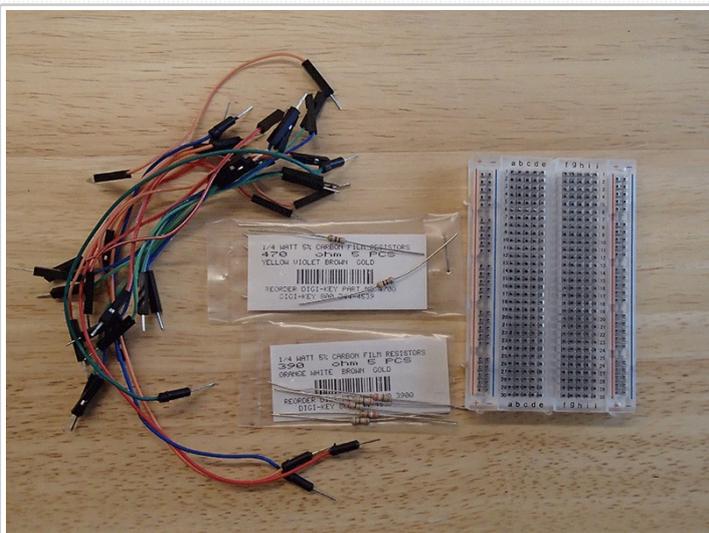
Push the LED back up into Clyde's leg. It should fit perfectly in the base of the foot, assuming your connections are nice and neat. On a couple of legs, I had to give a little tug from the opposite end of the wire to get the LED in place. Once the LED is in place, slip Clyde's silicon slipper back on the foot. Now repeat [step 2](#) for each of Clyde's legs.



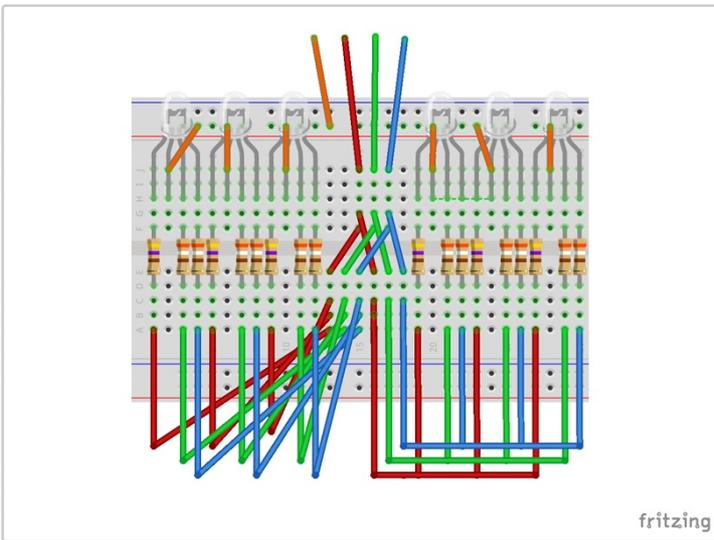
Step 3: Build the circuit

It's time to build the circuit. You'll wire all 6 RGB LEDs in parallel. This means that we will use 1 wire to connect all the red leads, one wire for all the green, one wire for all the blue, and, you guessed it, one wire for all the VIN. The Vin on the LED Ext pin headers is 12v when Clyde is plugged into the wall. I calculated the resistor values for this circuit based on the data sheet for the Adafruit RGB LEDs, available on their website. Be sure to check the data sheet of the LEDs that you are using and calculate the correct resistor values.

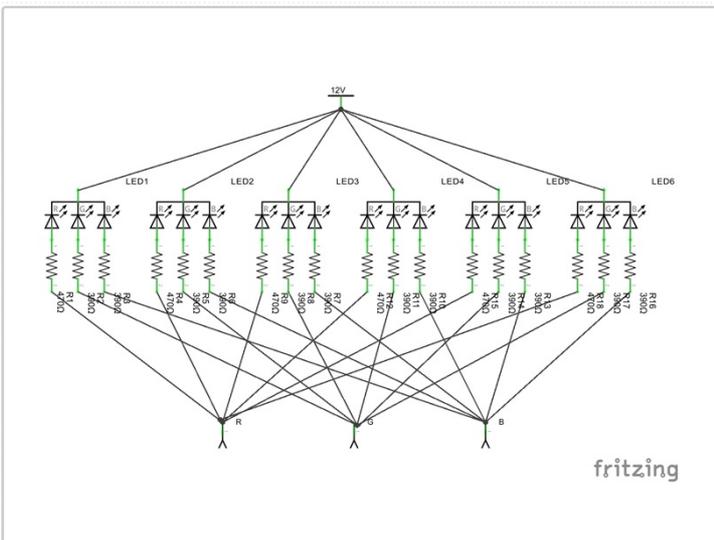
You'll need the male-to-male jumper wires, the resistors and the breadboard.



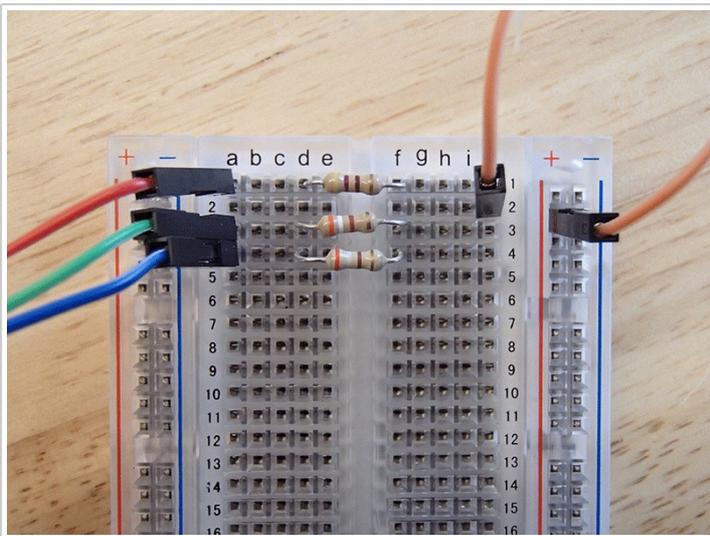
Here is a breadboard diagram of the circuit created with [Fritzing](#), a free simple electronics documentation software. You'll want to build pretty much the same thing.



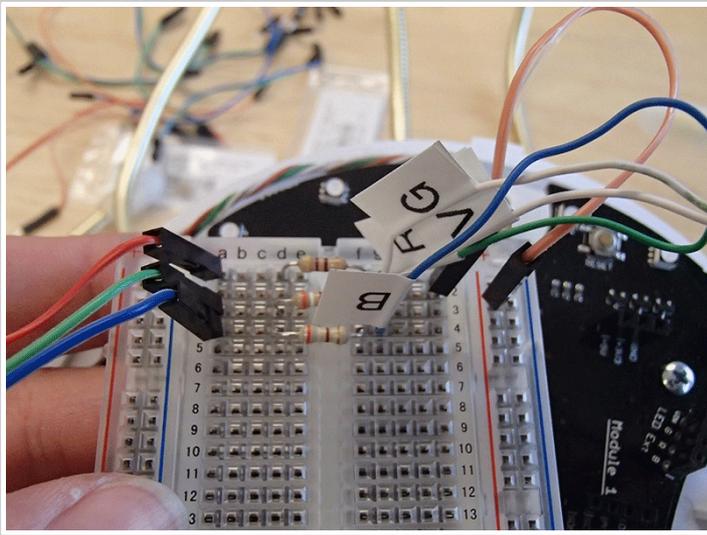
Here is a schematic of the circuit, also created with [Fritzing](#).



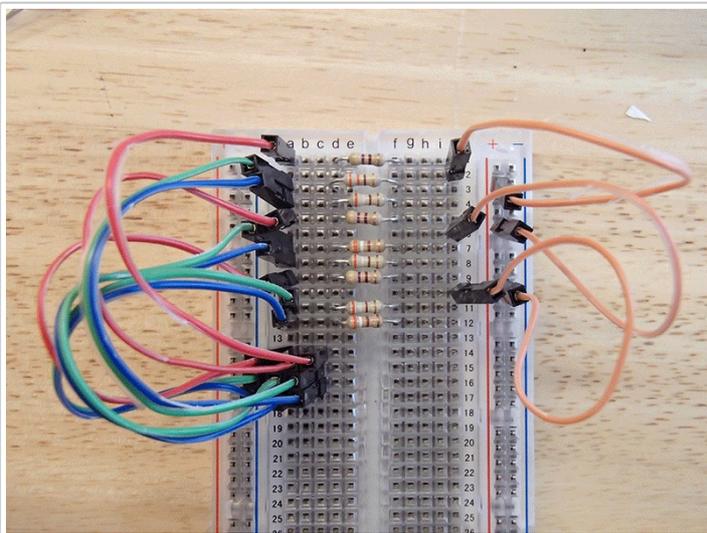
Each LED requires this circuit. In row 1: red jumper wire, 470 ohm resistor across the center channel. Row 2: Right side to Vin. Row 3: green jumper wire, 390 ohm resistor. Row 4: blue jumper, 390 ohm resistor.



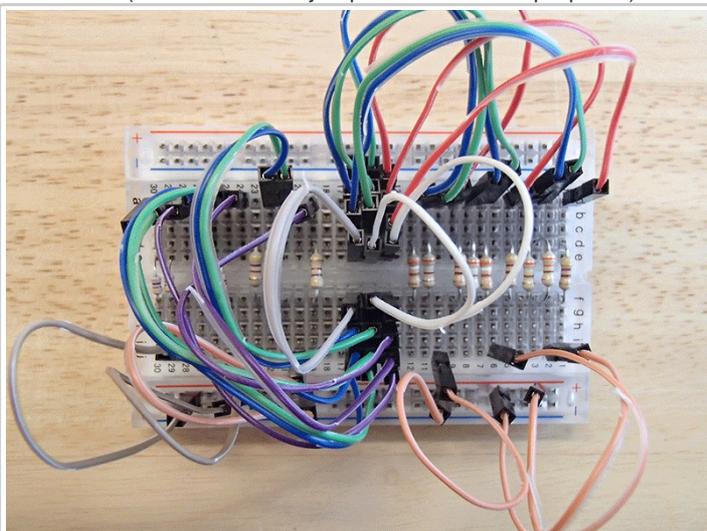
This is what the circuit looks like with the wires from 1 of Clyde's legs.



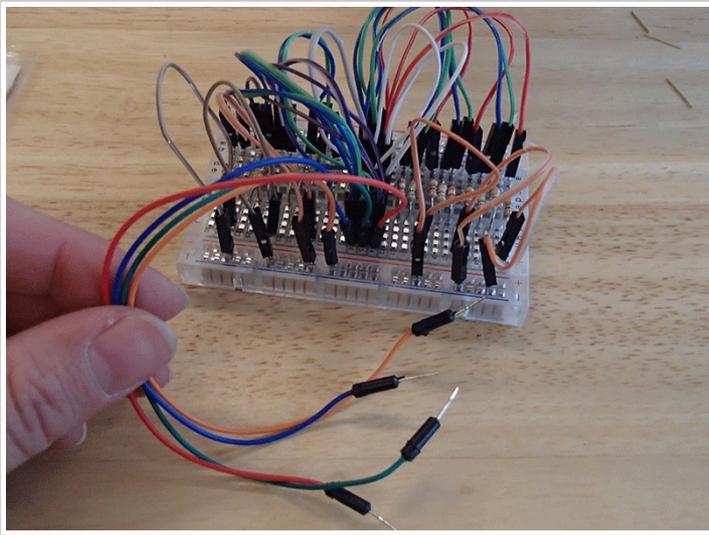
Wire the circuit in groups of 3. R-Vin-G-B. R-Vin-G-B. R-Vin-G-B. Then connect the loose end of each RGB wire together in a row with all the other jumpers of that color. Got that? Rephrased: Wire all the red jumper wires onto one row. All the greens together in their own row. And same for the blue.



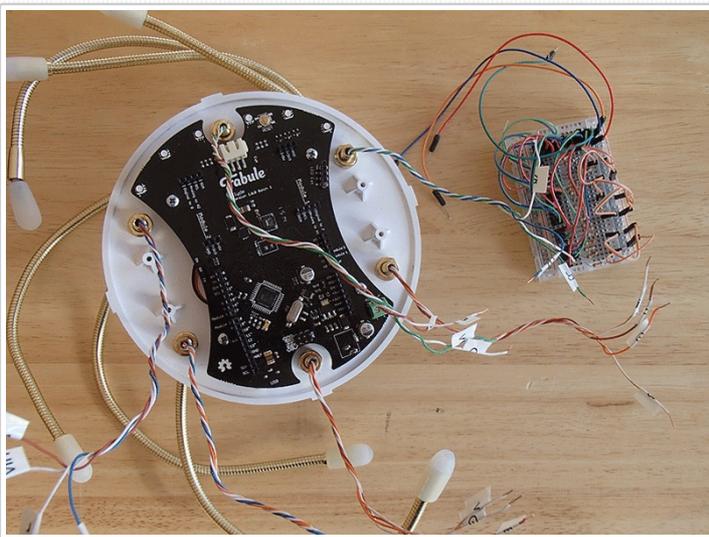
Wire the other 3 circuits in the same way. I ran out of red jumper wires so I used purple instead. Wire the color rows together: red to red, green to green and blue to blue (I used the white jumper wires for this purpose.).



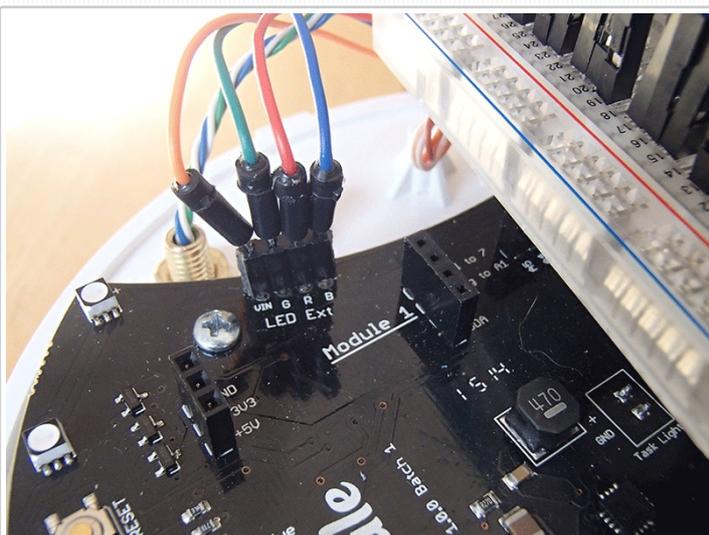
Add 4 more jumper wires, plugged into the matching color row. You'll connect the circuit to Clyde's board with these jumpers.



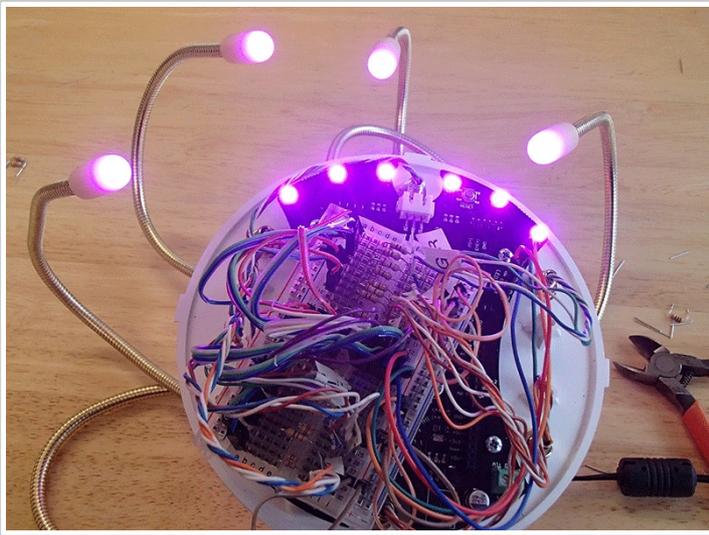
Now you are ready to plug the LED lead wires into the breadboard.



Make sure Clyde is unplugged from the power cord and the usb cord. Plug the wires into the corresponding pin header.



Plug Clyde into the power source. Ta-da! Clyde has twinkle toes! The LED color should match the LED color on the main board. If it does not, go back and test the connections in your circuit to make sure that the wires are properly inserted in the breadboard.



Step 4: DIY No Sew Tutu

To make Clyde's tutu I followed this blog post: [DIY No Sew Tutu for Little Girls](#). I used a ribbon instead of an elastic.

Don't forget to share your Clyde Halloween Hacks with us! We have a Clyde Halloween Costume Contest until Nov 10th. Learn more about it here: <https://fabule.com/eng/blog/clyde-halloween-costume-contest>

Happy Halloween from the Fabule Team!



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