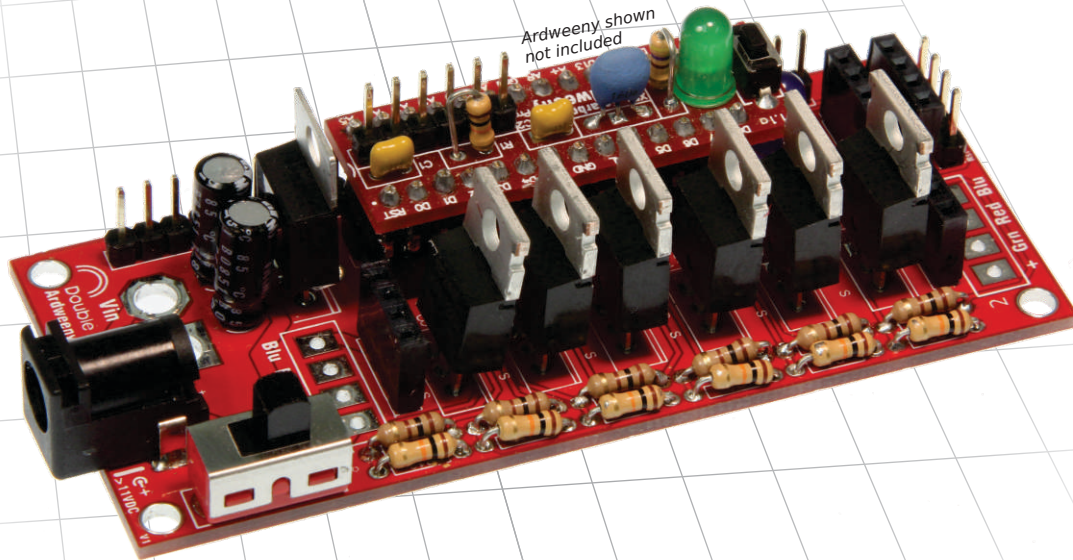


Double Rainbow

RGB LED Strip Controller Backpack for the Arduino™ Compatible Ardweeny

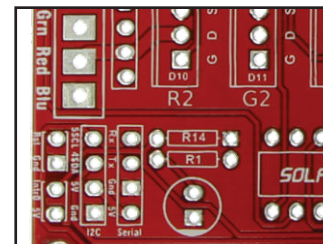
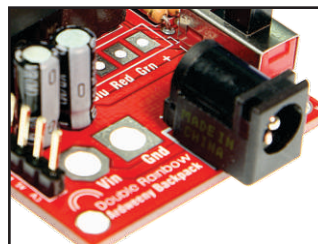
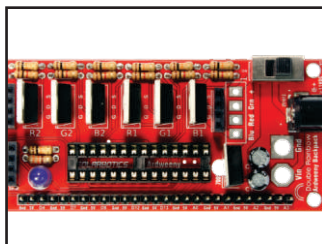
“It’s so Bright and Beautiful!”



Build Time: 20 minutes
Skill Level: Intermediate (2/5)

RGB color strips are nifty, but a bit difficult to drive and control unless you have the right tools. And by tools, we mean an Arduino-compatible device, like the Ardweeny, and *this kit: The Double-Rainbow RGB Strip Controller!*

- Ardweeny-compatible (not included)
- Common-Anode RGB strip compatible
- Drives 2 strips independently
- Capable of 5A sustained current draw
- G/V/S servo-style breakouts for remaining I/O
- BLINKM™-compatible I²C header port
- Remote kill-switch interrupt header
- All the RGB channels are on PWM lines



INTRODUCTION

ONCE upon a time, there was a little event called the "Calgary Stampede Grandstand Show", and the fine costume designers at the show walked into Solarbotics and said "We need RGB strip lights, and they must blink, and be small, and run multiple strips - can you help us?"

So the geeks at Solarbotics went into a huddle, discussed options, ate cookies, and came back and said "Why yes, we think we have a solution for you". And amongst the cookie crumbs and whiteboard diagrams, the "Double Rainbow" RGB LED strip light controller was created!

The costume designers were quite impressed, and took their Ardweeny & Double-Rainbow bundles and attached them to their costumes, and made their Grandstand stage show a huge success! The end (well, until we added a bit of polish, and developed this kit for you).

Here's the point list of features:

- ▶ Drives two RGB strips, up to 5A constant current
- ▶ Ardweeny backpack (Ardweeny Arduino-compatible not included)
- ▶ Common-Anode RGB strip compatible (Vcc, plus RGB lines)
- ▶ IRFZ44E FETs Derated to ~20A@5Vgs (1 for each of the Ardweeny PWM lines)
- ▶ Accommodates 0.1" pin headers (included) *and* 0.137" screw-terminal header (optional)
- ▶ 5A-rated power switch (use bypass wiring to utilize a larger current capacity)
- ▶ GVS-style (Gnd/Vcc/Signal) breakout headers for remaining I/O
- ▶ Interrupt header for remote switch for light program pausing/disabling
- ▶ BLINKM-compatible I2C header
- ▶ Open-Source Hardware Compliant - see the schematics & design documents for yourself!

Our RGB strips are rated to draw 3.25A per 5 meter reel at 12VDC (producing FULL white) and we designed this board to be able to run 2 (60 LEDs/meter) reels. Due a bit of a voltage drop on the MOSFETs the overall current draw is less than the normal 6.5A so you can easily drive 5 meters (~10') per side. If you'd like to run 2 reels constantly at Full white (or run longer strips) we'd suggest to bypass the power switch & try not to snuggle up to the FETs! The PCB temperature of will reach ~52°C (in a room of 22°C ambient) so it also will get a little warm, not too hot but great for night-time costumes!

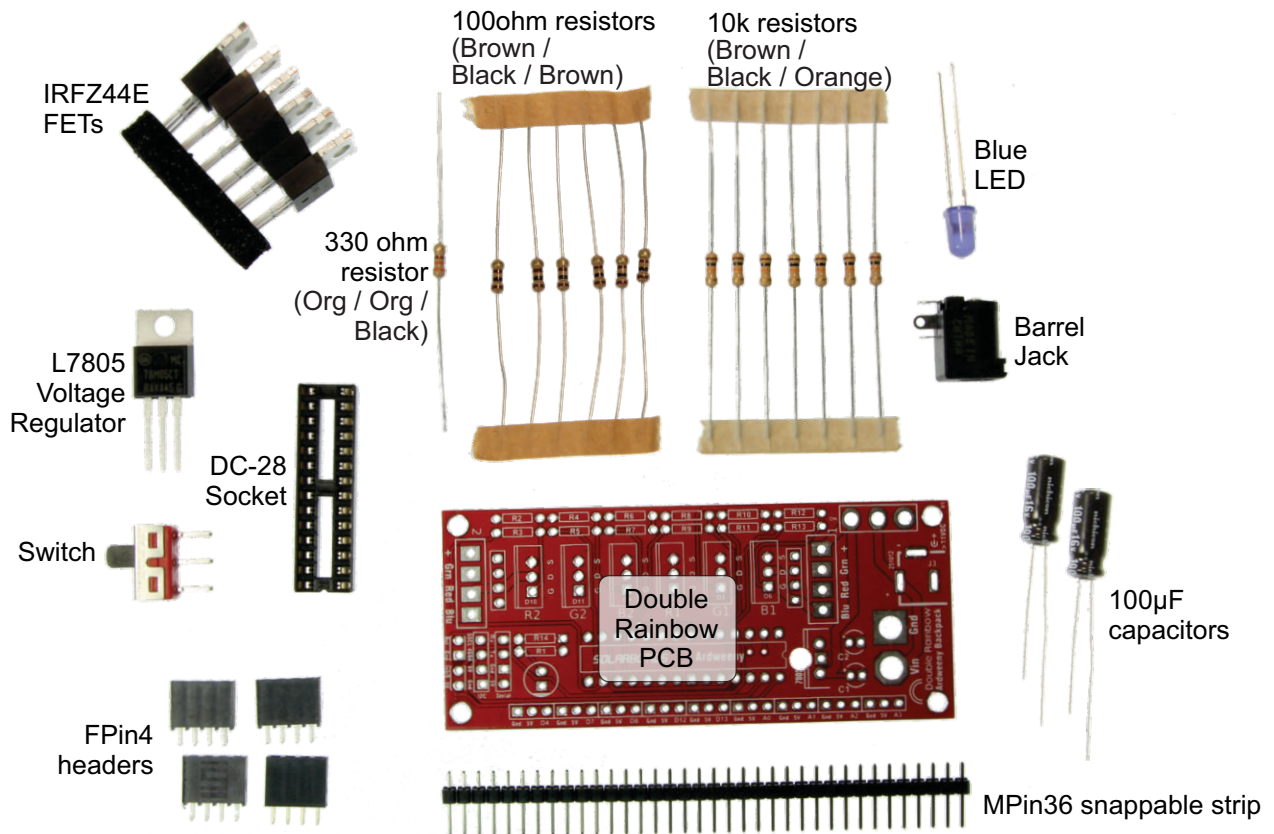
The Double Rainbow Backpack is licensed under the Creative Commons A-SA 3.0 license. Get full design files from our website!

Disclaimer of Liability

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PARTS LIST

- 1 x Double Rainbow printed circuit board (PCB)
- 6 x IRFZ44E FETs
- 1 x 330 ohm LED resistor
- 6 x 100ohm resistors (brown / black / brown)
- 7 x 10k pull-down resistors (brown / black / orange)
- 2 x 100 μ F 16V electrolytic capacitors
- 1 x Blue LED
- 1 x 78M05 5V voltage regulator
- 1 x DC-28 pin Ardweeny IC carrier
- 1 x SWT16 5A Slide Switch
- 4 x FPin4 4-position female pin header
- 1 x MPin36 Snappable 36-pin male interface header
- 1 x 2.1mm Barrel Jack
- **Optional:** 2 x 4-position 0.137" screw terminals



We strongly suggest you count the parts in your kit to make sure you have all the parts listed (c'mon - there's barely a handful of parts, so count them!). If anything is missing, contact Solarbotics Ltd. for replacement parts information.

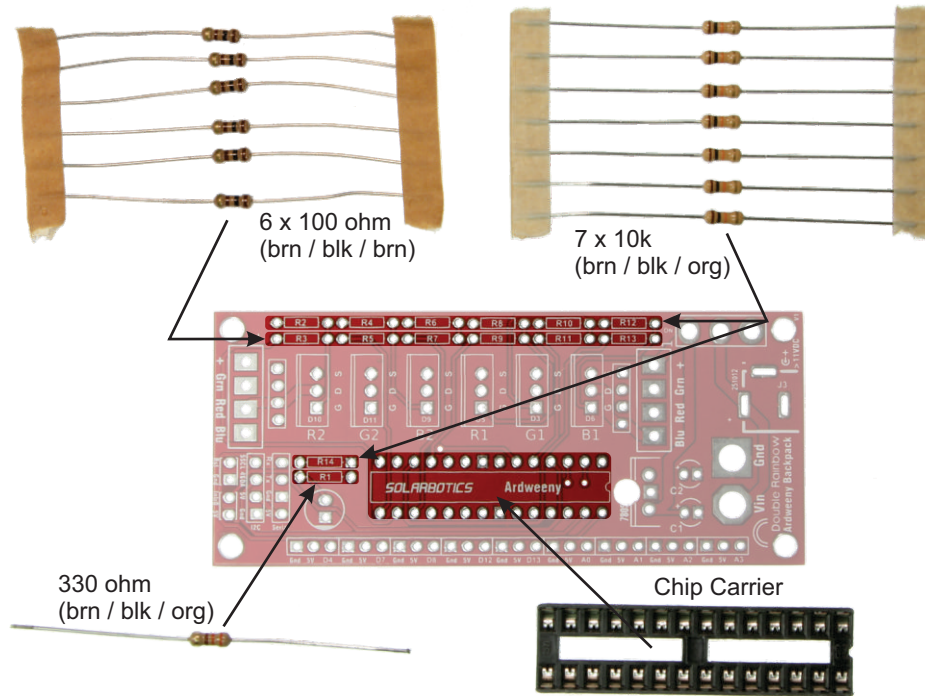
Tools & Materials Needed (The 4 'S's):

- Soldering iron
- Safety glasses
- Solder
- Side/flush cutters

CONSTRUCTION!

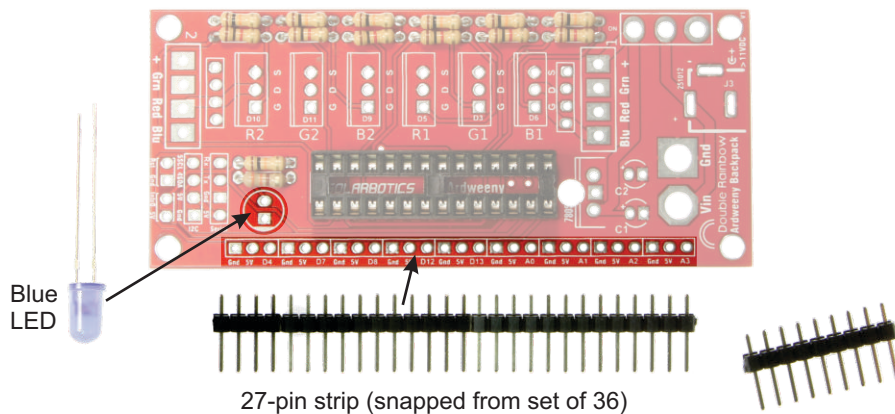
Step 1 - Resistors and IC Carriers: Resistors resist. Carriers carry. Makes sense.

- Install the 100ohm (brown / black / brown) resistors to positions R3, R5, R7, R9, R11 & R13. These are input Ardweeny I/O protection resistors .
- Install the 10k (brown / black / orange) pull-down resistors to locations R2, R4, R6, R8, R10, R12, and R14. These make sure the FETs are off by default.
- Install the 330 ohm (org / org/ brown) resistor at R1, which powers the blue LED.
- Install the DC-28 carrier to the only place that'll fit it.



Step 2 - LED and Pins: Blue LEDs are cool. Pins are cool too (but a bit nerdy).

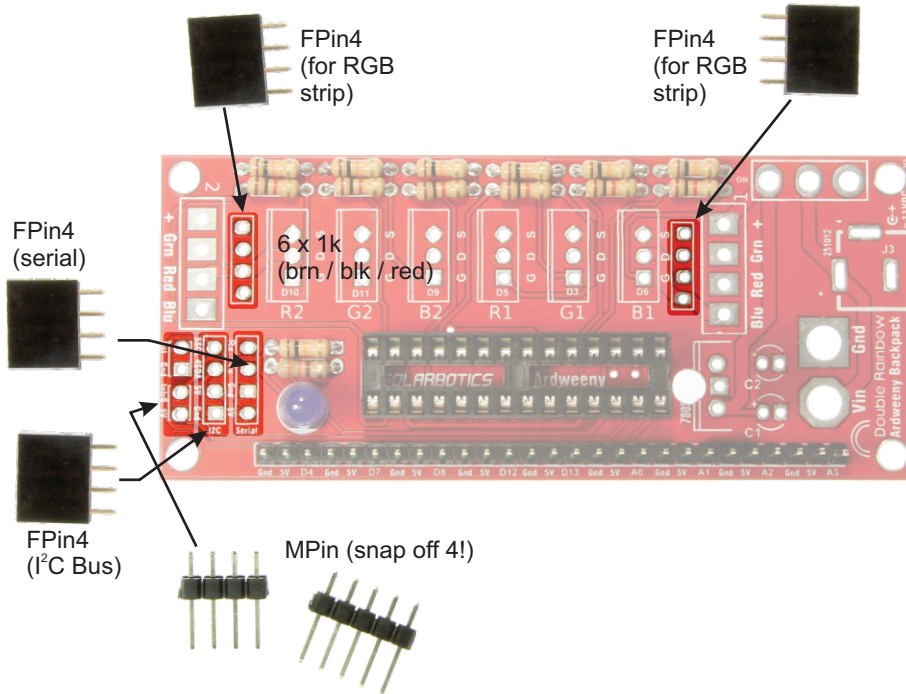
- Install the blue LED at the *only* solo LED location. Match the outline!
- The pins come as a giant 36-pin strip. Snap of a set of 27, and install them to the extra I/O expansion pads. Or not - it's useful for getting extra work out of your Ardweeny!



CONSTRUCTION!

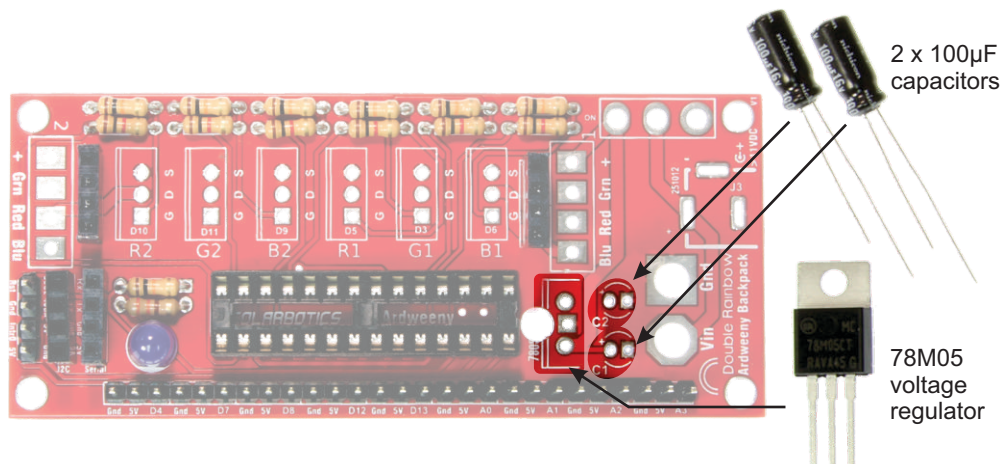
Step 3 - Male & Female Pins: You're going to need places to plug stuff, so let's mount the Female 4pin sockets (Fpin4).

- The Fpin4s are completely optional as soldering your RGB strips in directly is probably a wise choice but if you'd like to have connectors that are easily removable solder the first two in the spots shown to make it easy to plug in the RGB strips, and the second two into the Serial and I²C bus spots for accessories.
- Snap off the remaining set of MPins into a set of 4 for the remote reset and interrupt pin connections, which are useful for mounting easy-to-reach controls for your project.



Step 5 - Voltage Regulator & Capacitors: Pappy always said that voltage weren't worth nuthin' if it weren't regulamated.

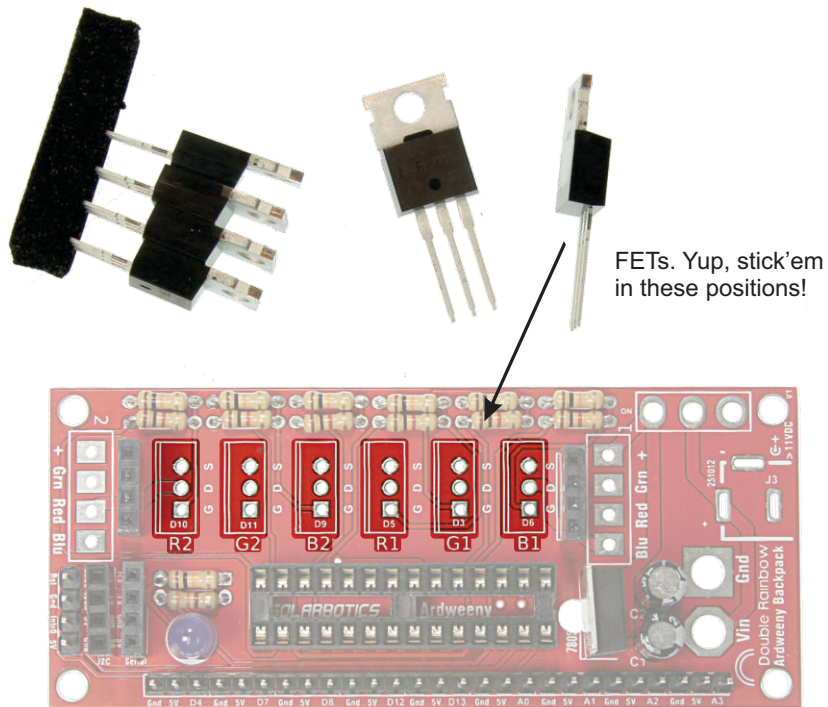
- Install the L78M05 in location '7805', matching the metal tab orientation.
- Install the 100 μ F capacitors in locations 'C1' & 'C2', with the white stripe side going into the square pad's hole.



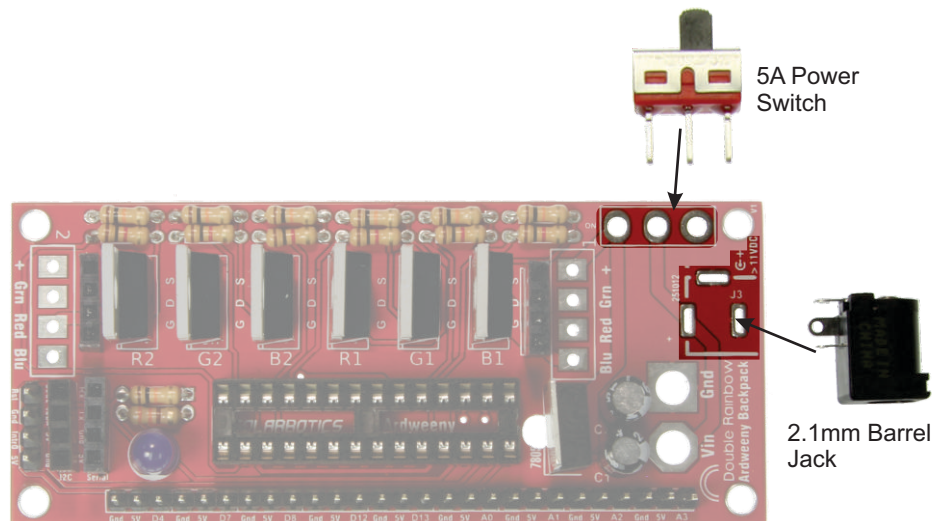
CONSTRUCTION!

Step 6 - FETs: Ah, the muscle behind the brains! But the muscle behind FETs is also sensitive to static discharge - make sure you are grounded before handling these parts. That's why they're stored in the anti-static foam - static protection!

- Install the 6 FETs in positions R1, G1, B1, R2, G2, & B2, with the tabs matching the orientation shown on the circuit board. These labels are also what channel they drive.

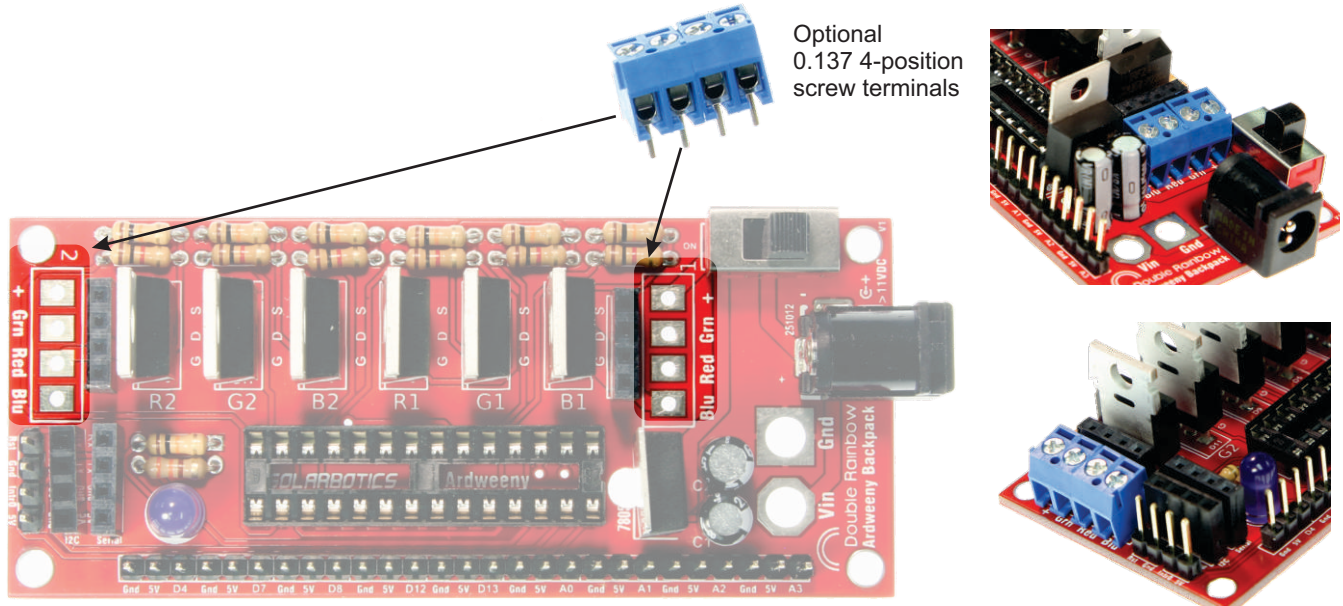


Step 7 - Power Switch & Jack: Here's the final assembly steps. The switch is rated for 5A, which should be beefy enough for most applications. If you expect to run more current than that, consider running your power through the large 'Vin' and 'Gnd' pads, jump-wire the middle and left switch pads, and use plugs or relays to power your Double Rainbow.



CONSTRUCTION!

Step 8 - Optional Screw-down Terminals: The standard FPin4 female headers will be fine for most of your regular RGB strip applications, but if you want a *really* sturdy and high-current solution, find some 0.137" spaced terminal headers, and mount them on the spaces provided on the PCB.

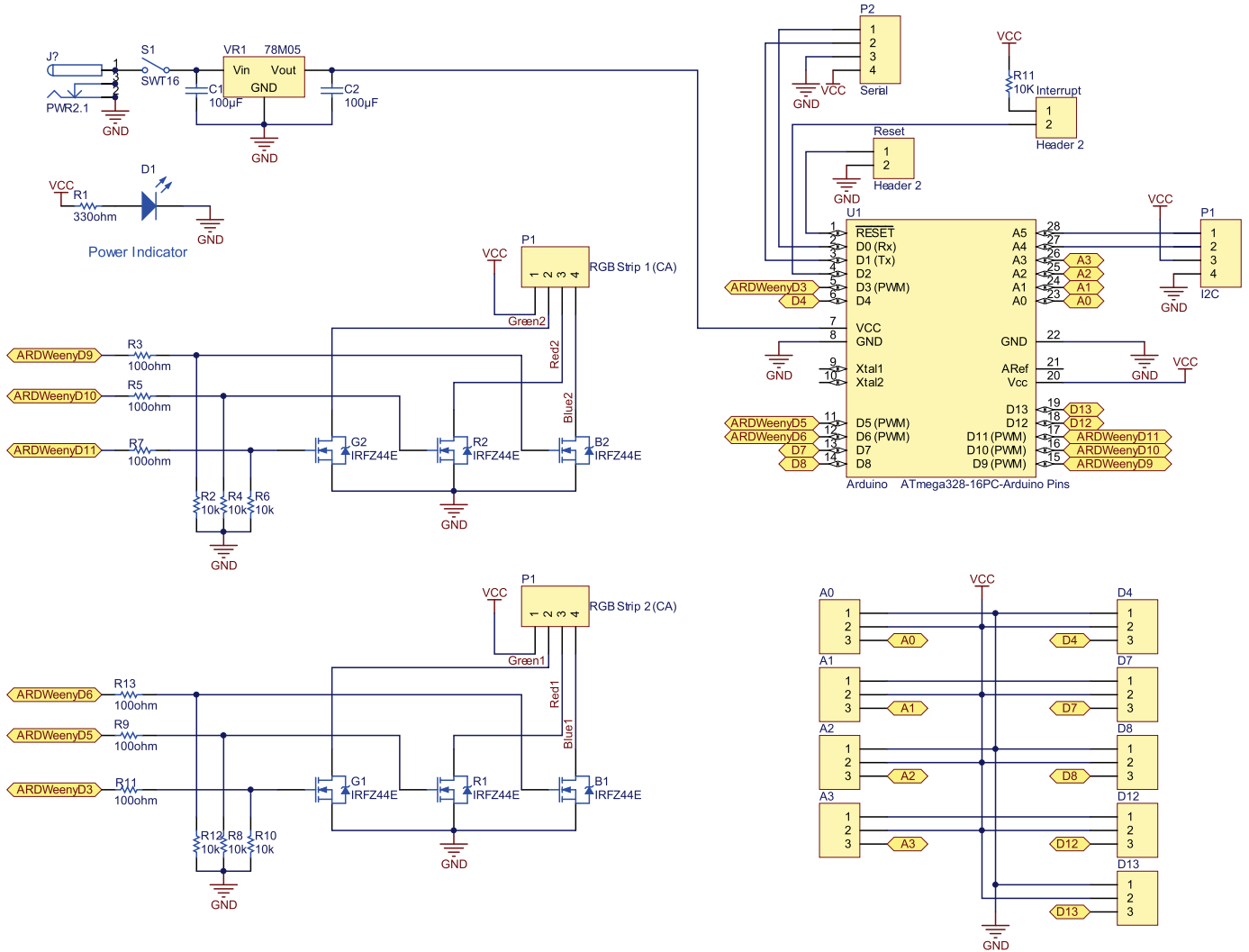


Step 9 - Da Ardweeny!: Plug the Ardweeny into the socket, with its LED closest to the PCB's blue LED. Add code. Add RGB Strips. Add power. BEHOLD THE DOUBLE RAINBOW!

Ok, we're not always such wise-butts around here. Check the Documentation tab for some sample code you can load to your Ardweeny to run your RGB strips.

DOUBLE RAINBOW RGB ARDWEENY BACKPACK

Schematic



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