

Chameleon Lamp



Chameleon Lamp is a lamp that changes its color based on the color of the surface it's placed on. A color sensor on the bottom of the lamp detects the color of the surface and controls RGB LED lights inside the lamp.

Materials – Base of the Lamp

The base of the lamp is made with laser cut 4 mm plywood with all the electronics embedded inside the base in a sandwich design. No screws are needed for assembling the base or for attaching the electronics. Each layer of the sandwich is cut so that the electronics click into place.

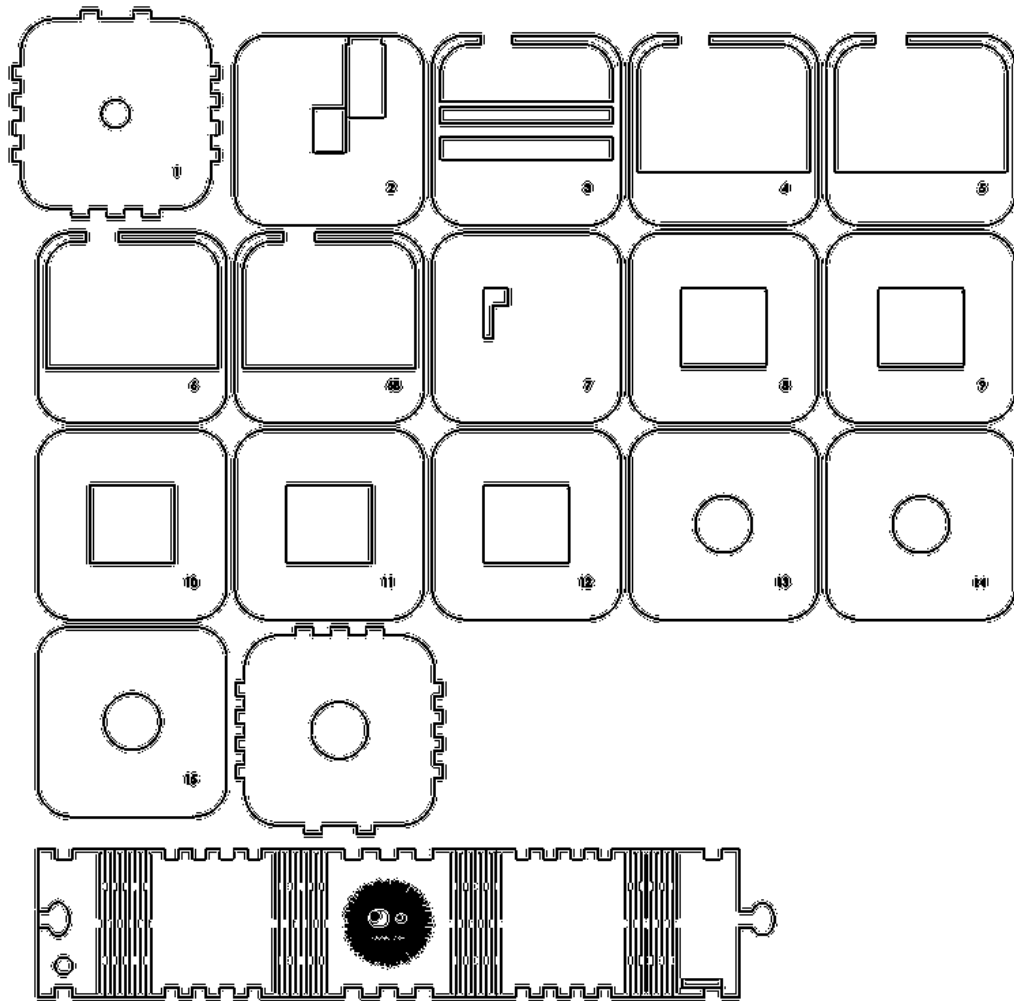
Designing some sort of stands for the parts would have taken less material and might have been easier, but the design I chose also adds some weight to the base, which makes the lamp more stable when using a larger diffuser.

The rounded corners were made with the help of [this Parametric Flexbox](#).

- Laser cut 4 mm plywood

Settings for the laser cutter:

- cutting: 8/65/500
- engraving: 60/90



Materials – Finishing

Finishing:

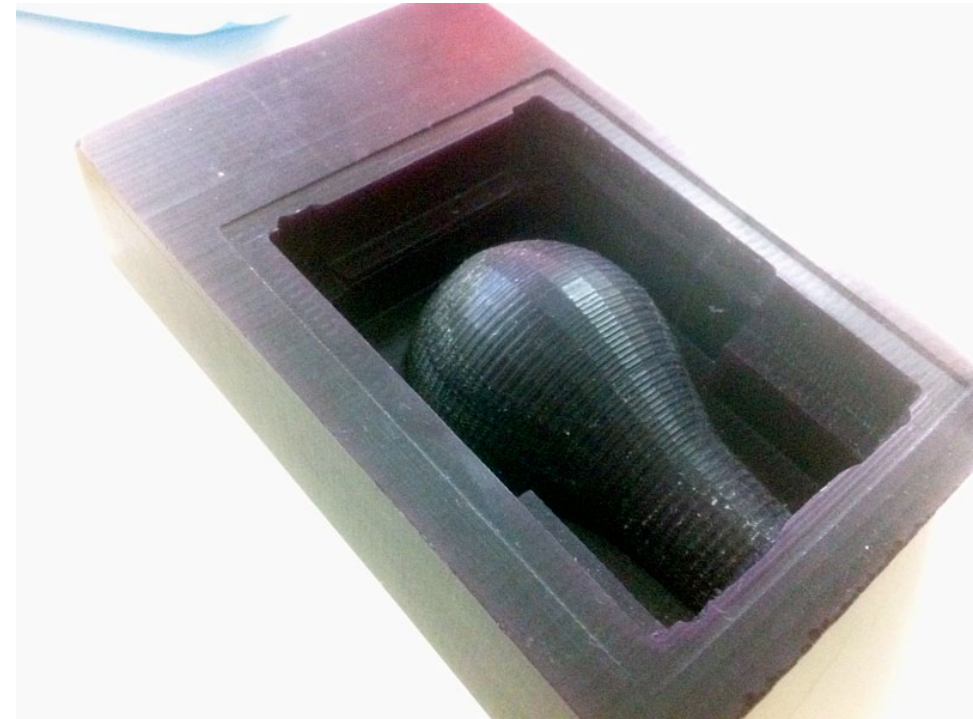
I used Osmo color wax for finishing the base. Just to make it look a bit different from the plain plywood.



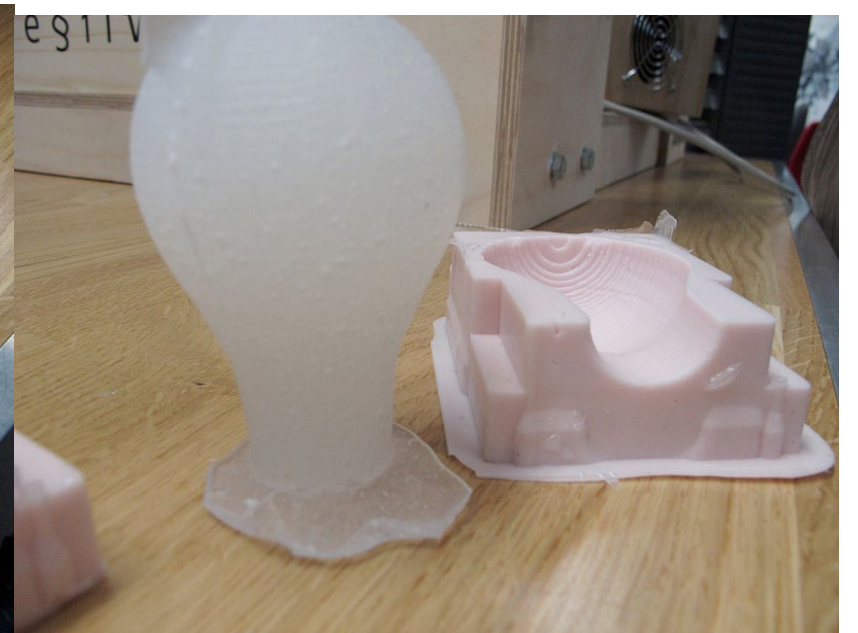
Materials – The Lamp Diffuser

I decided to make the diffuser out of silicone since there was no diffused acrylic available.

- I milled the mould for half of the light bulb
- Then I casted two sides of the bulb with silicone
- and then I finally casted the final bulb with Sorta Clear silicone



Materials – The Lamp Diffuser



Materials – The Lamp Diffuser

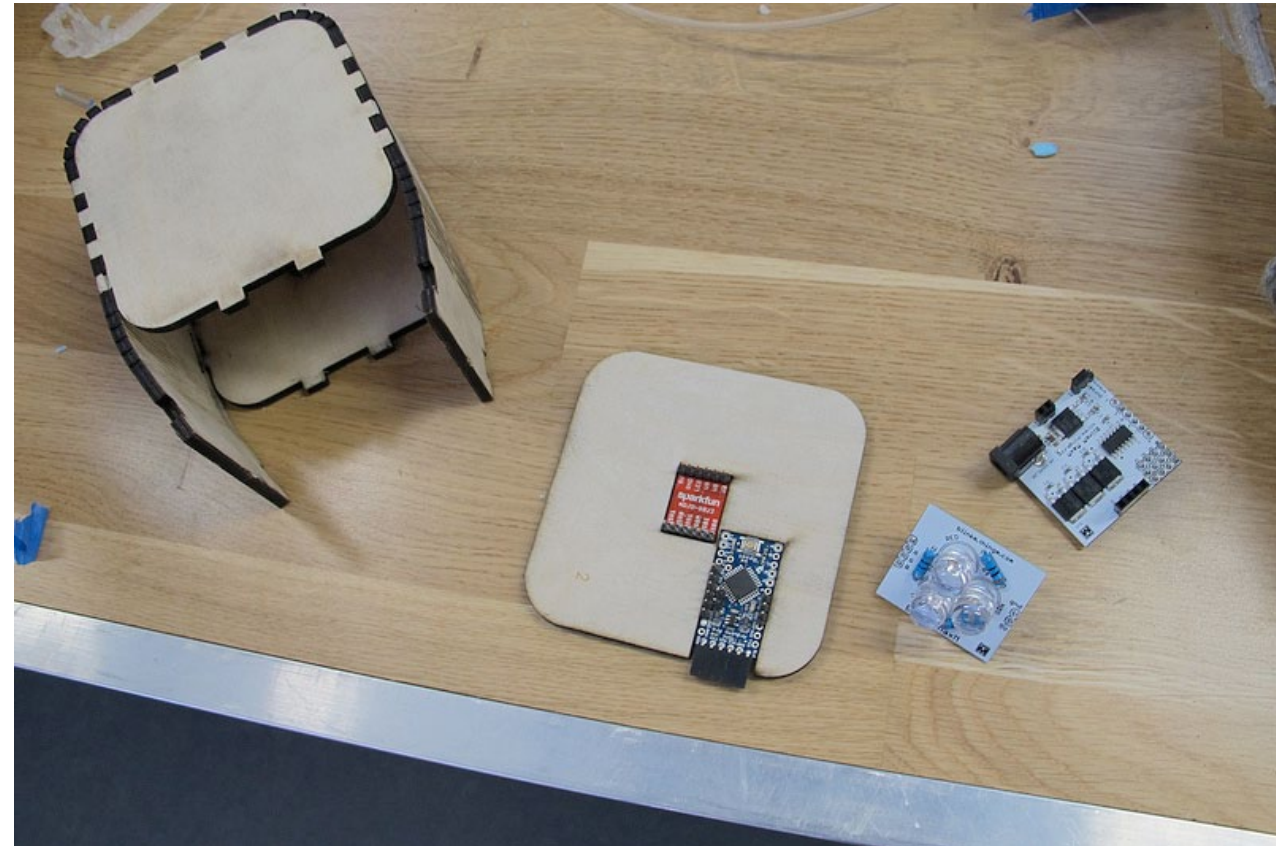
I also tried to 3d print it, but the Ultimaker was having a bad day, so I only got part of it printed.



Materials – Electronics

The sensor is connected to the Arduino Pro Mini, which scales the RGB input values and controls the MaxM RGB LED. The BlinkM MaxM also supports straight input from sensors, but the scaling was much easier when using the Arduino in between.

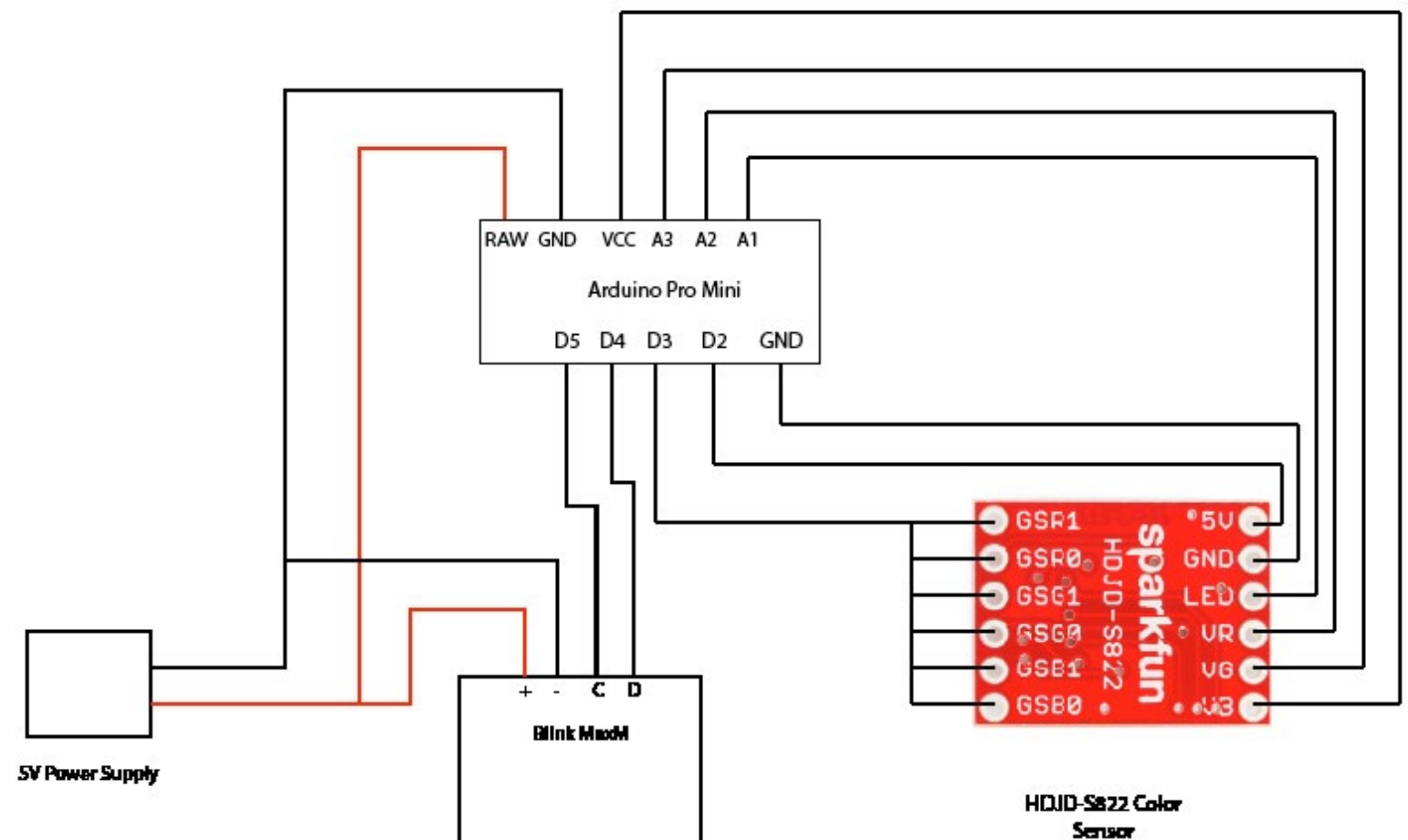
- BlinkM MaxM
- HDJD-S822 Color Sensor Breakout
- Arduino Pro Mini 5V



Materials – Electronics

I have it wired in a slightly weird way. And since the power supply is 5V, it should be wired directly to VCC and not to the RAW input which goes through the regulator. It still works, but not in the most ideal way. This way of connecting the parts just made sense with the layout and the connectors that I had available. If I make another version of this, I will rewire the electronics.

I had to switch to software i2c instead of the hardware implementation since using the i2c on the mini seemed to somehow mess with my analog inputs. Not sure what was the exact cause, but using the SoftI2CMaster (<https://github.com/todbot/SoftI2CMaster>) library seemed to fix the issue.



Improvements

Here is a list of things I would fix for the next version.

- Move the sensor higher or add some feet to the base. The led of the sensor is too bright when the surface is so close. Other option would be to dim the sensor LED
- Re-wiring the electronics:
 - Sensor LED to PWM pin
 - Sensor VCC and GND to digital pins
 - Power supply straight to the VCC of the Arduino