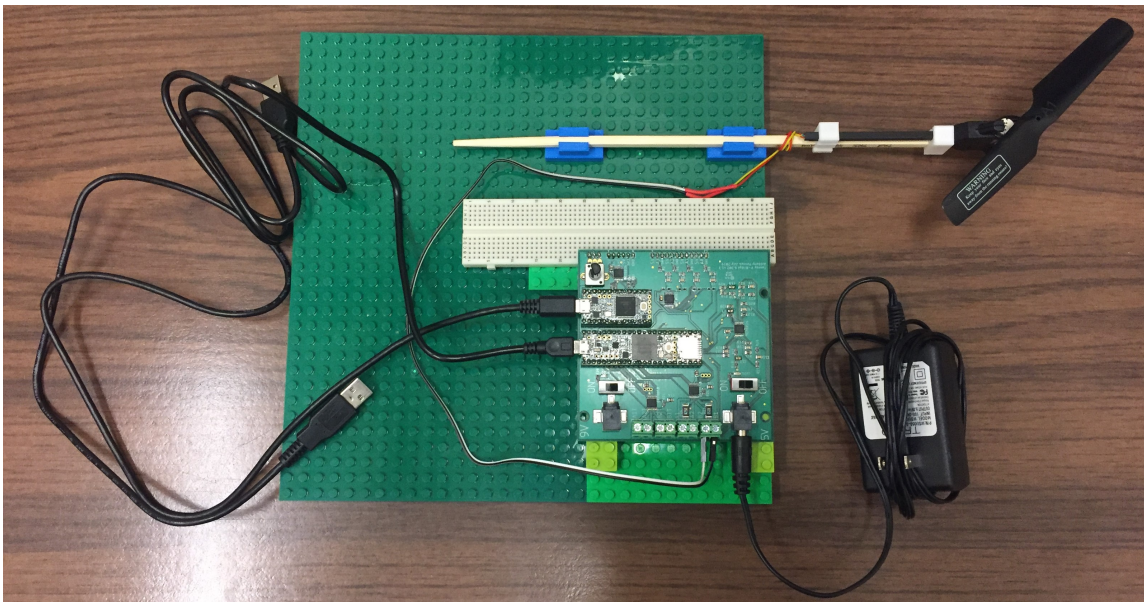
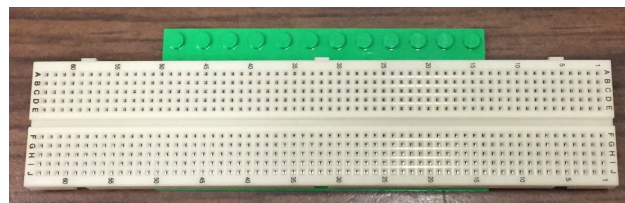


## 4.4 Assemble the hardware

See the picture below for guidance. It's not hard to assemble — it's just Legos after all.



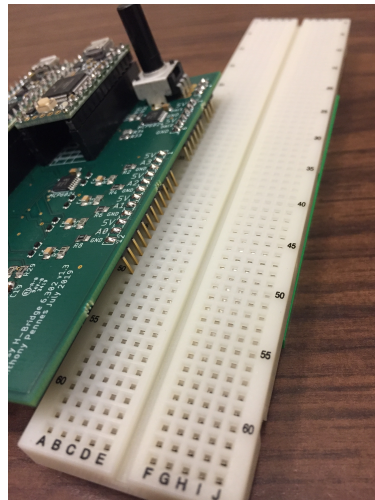
1. Peel the paper off of the breadboard to reveal the adhesive backing. Make sure to keep the adhesive surface clean, and make sure that the  $6 \times 12$  lego plate is clean. Attach the top side of the  $6 \times 12$  plate to the adhesive surface such that the right edge of the plate is flush with the right side of the breadboard. Keep the plate and breadboard centered lengthwise. Press firmly together.



2. Attach the other  $6 \times 12$  plate to the bottom left corner of the base. Add the two  $2 \times 4$  bricks as shown.

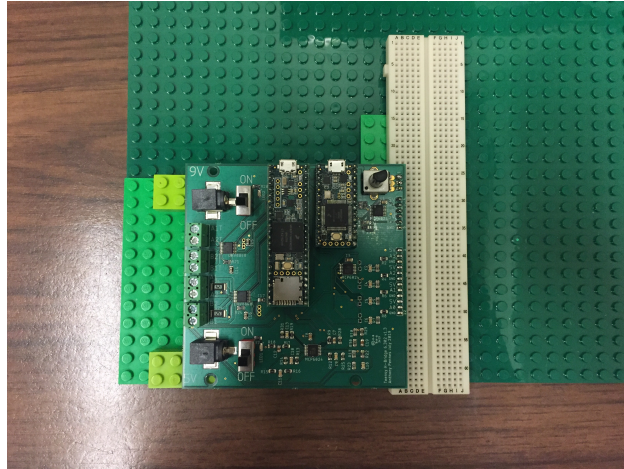


3. Attach the printed circuit board to the breadboard by inserting the pins on the edge of the PCB into the leftmost row of holes on the breadboard. The bottom pin (GND) should go into row 50 on the breadboard.

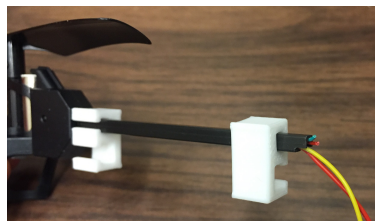


Press down to fully insert the pins, and be careful not to bend them!

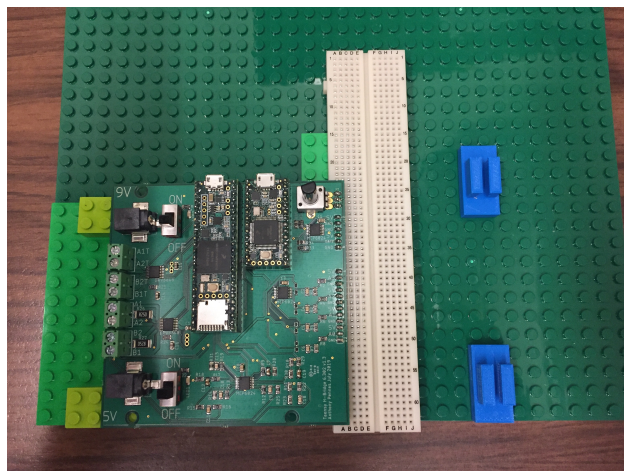
4. Attach the  $6 \times 12$  plate to the base such that the bottom edge of the circuit board runs flush to the bottom edge of the base, and that half of the  $2 \times 4$  bricks are visible. See below photo.



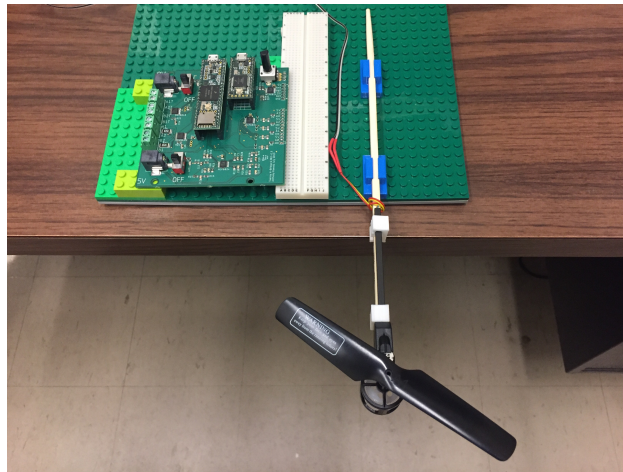
5. Attach two small 3D-printed pieces to the propellor assembly as shown, and connect a chopstick to the propellor.



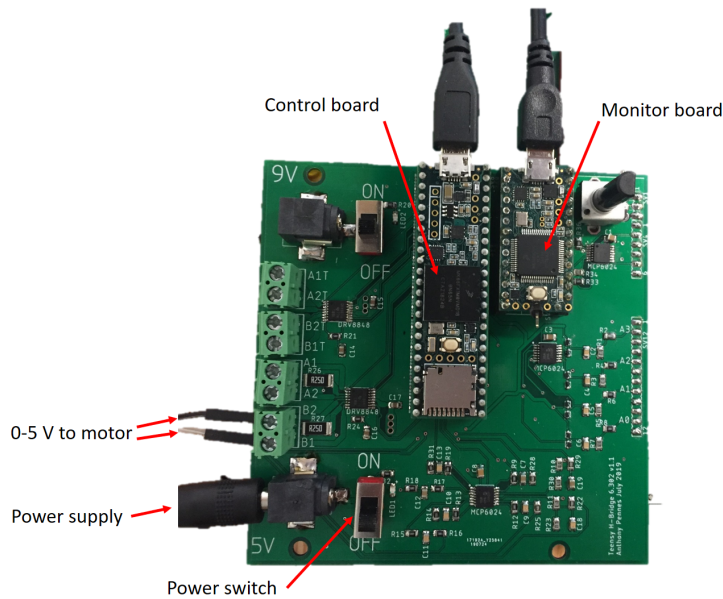
6. Attach the two 3D-printed lego-to-chopstick adapters as shown (exact placement not critical).



7. Slide the propeller / chopstick assembly into the adapters such that the propeller extends well clear of the base. Wrap the wire around the chopstick a few times for strain relief.



8. Loosen the screws on the bottom terminal block. Insert the wires from the motor into the holes of the terminal block as shown below, one wire into each of the two holes. Gently snug the screws to hold the wires in place. With just the right amount of pressure, you'll be able to remove and reinsert the wires without using a screwdriver.



Note that you may get the wires backwards! If the first time you turn on the propeller it spins in the wrong direction (the air blows up instead of down), just turn off the motor switch and reverse the wires.

9. When you're ready to do the lab itself (not the prelab), go ahead and insert the power cable. The external power is required to power the propeller, but is not required to test your software installation in the prelab.