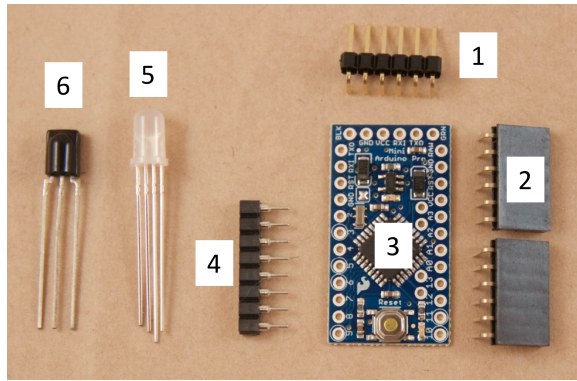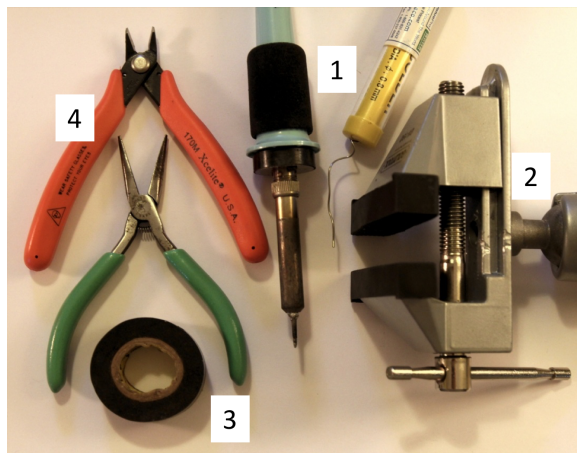# 4. Arduino Pro Mini

1. The Arduino build kit includes one set of male right angle header pins (1), two sets of female right angle header pins (2), an Arduino Pro Mini Board (3), a set of socket pins (4), an RGB (tri-color) LED (5), and an IR Receiver (6).
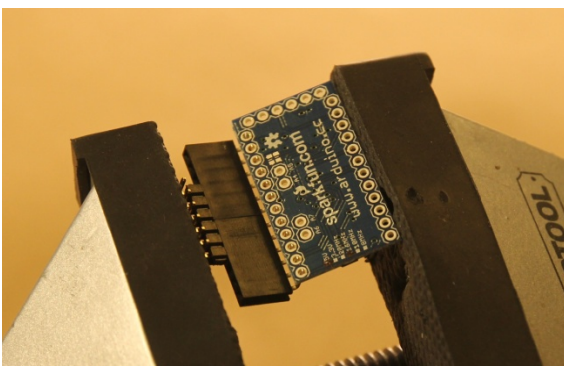

2. The tools and supplies needed are a soldering iron with solder (1), small vise (2), electrical tape (3), and flush cutters & needle nose pliers (4).

Safety Glasses/Goggles Required
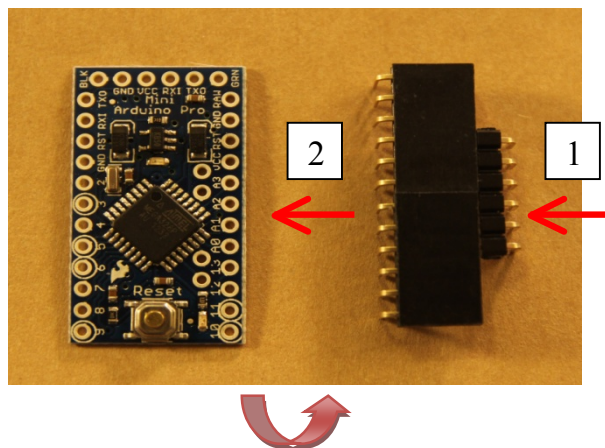
3. Use male header pins to connect and align the two sets of female header pins (1). Fit female header pins into pin holes on Pro Mini with a one-to-one alignment as shown (2).*
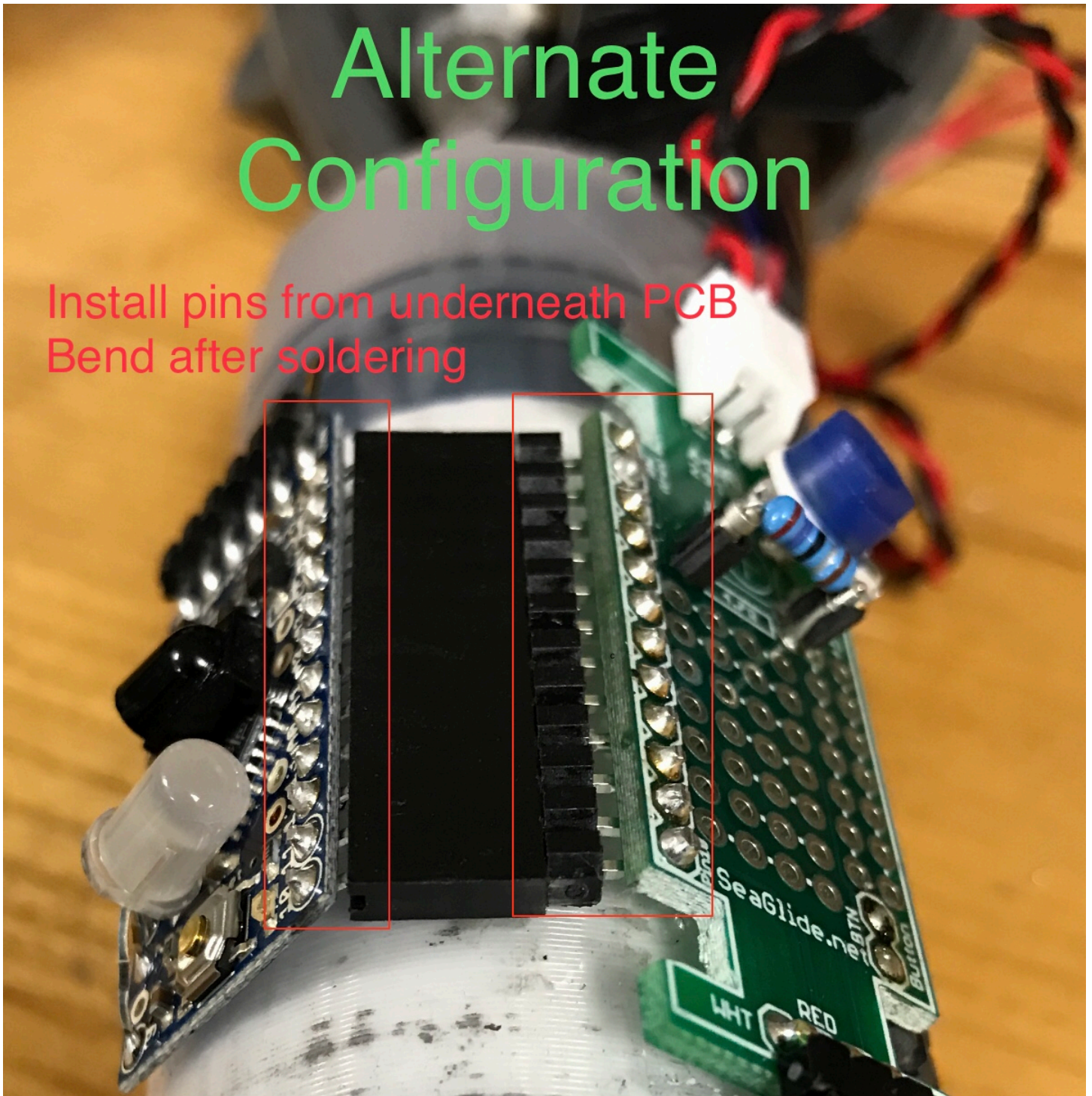

4. Flip the Pro Mini Board over while maintaining the connections between the pins and board. Secure in vise.

*Alignment is critical. The bottom pin aligns with hole (via) 10 and the top pin with RAW.
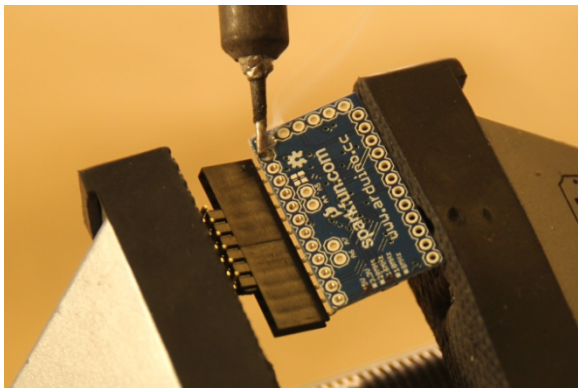
Alternate Configuration

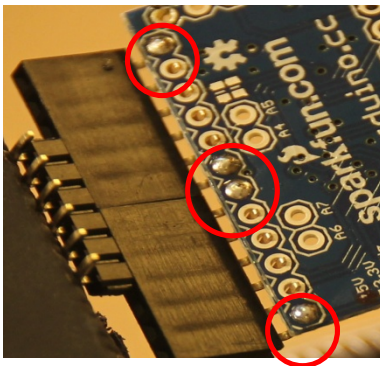Install pins from underneath PCB
Bend after soldering

5. Be sure that the female header pins are at an angle in relationship to the plane of the Pro Mini. (This angle helps the Pro Mini conform to the shape of the buoyancy engine allowing it to more easily fit inside the glider's access opening.)
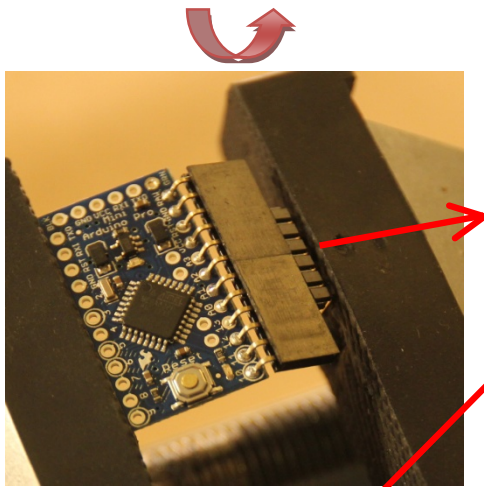
6. Solder connections…

7. First solder the ends and two middle pins to secure the two female header pin sets…
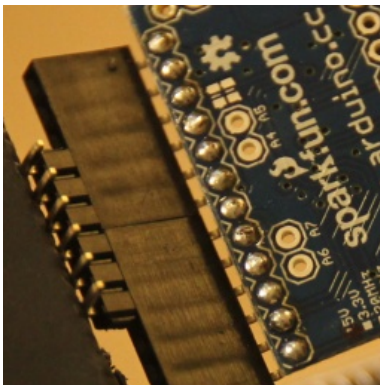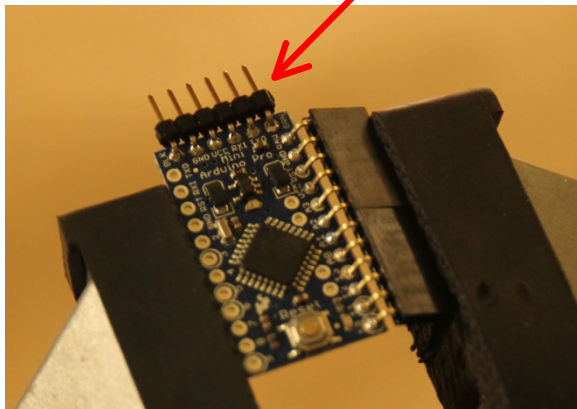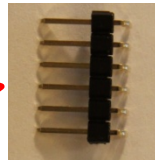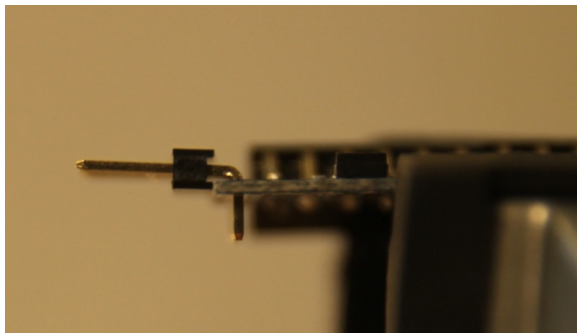
8. Then finish soldering the other joints.

9. Flip over the Pro Mini Board with newly soldered female header pins and check the solder joints.
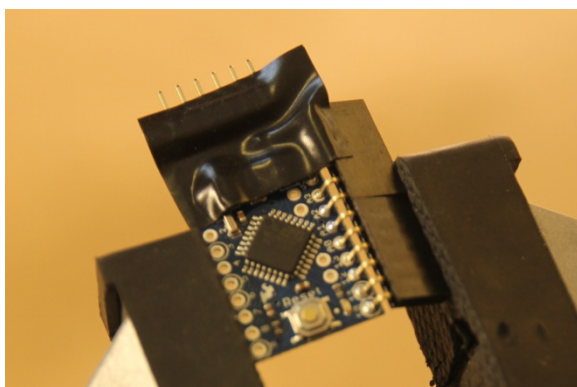
   Remove the male header pins that were used to align the female header pins.
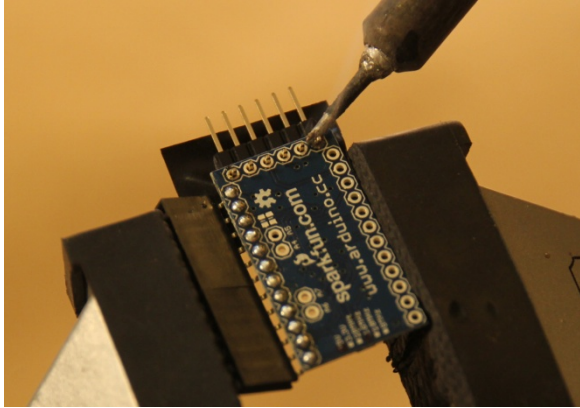
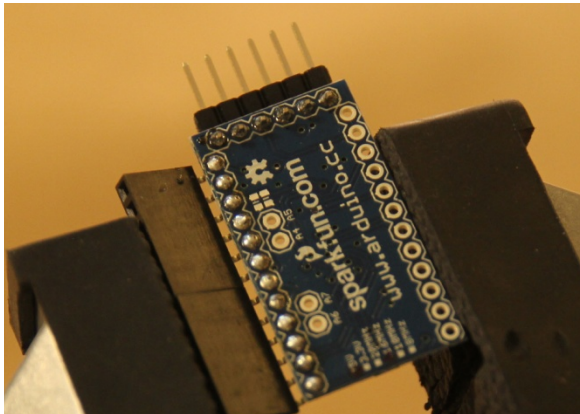10. These will be soldered to the end of the Pro Mini Board adjacent to the female header pins as shown.

11. The six longer pins should stick straight out and be parallel to the Pro Mini Board. Shown here viewed from the side.
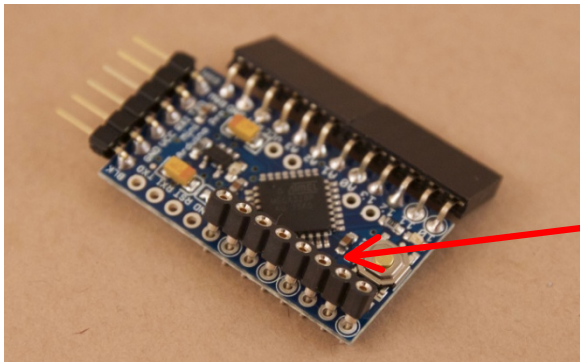
12. Tape male header pins in the position described above.
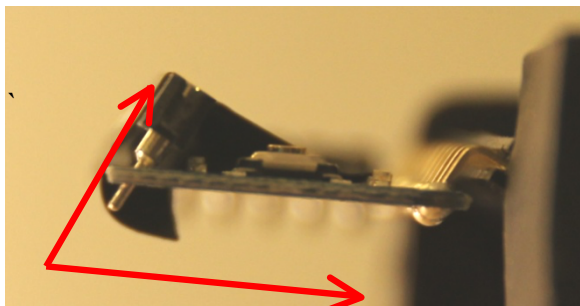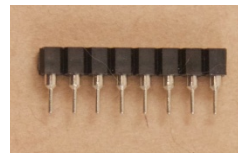
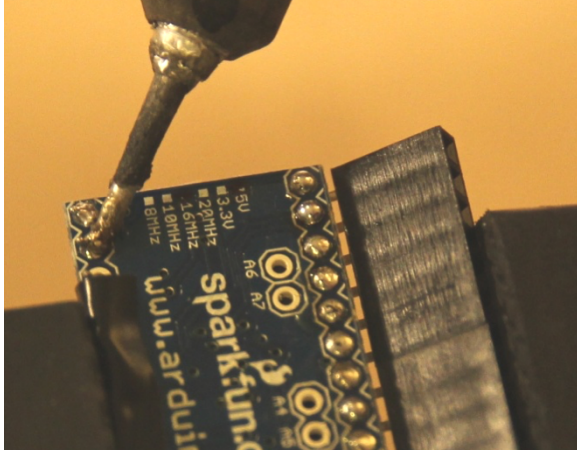13. Flip the board over and solder the pins in place.
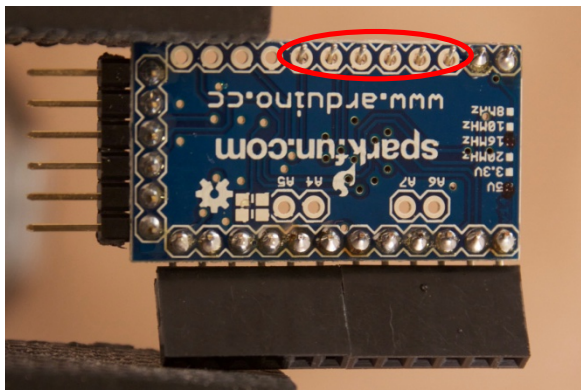
14. Check all solder joints.

15. Remove the board from vise and position the socket pin set on Pro Mini as shown.
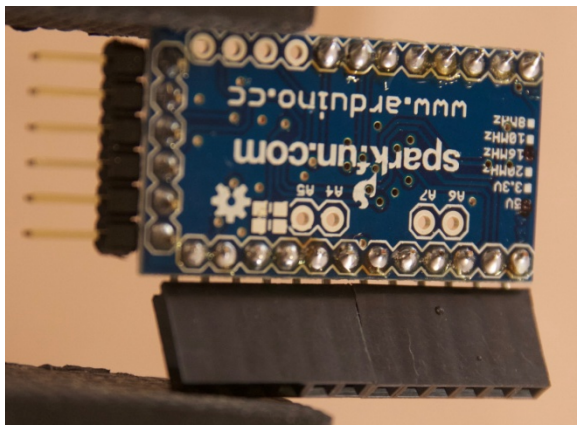
16. Tape the socket pins at an inward (acute) angle in relationship to the Pro Mini Board to secure them for soldering.
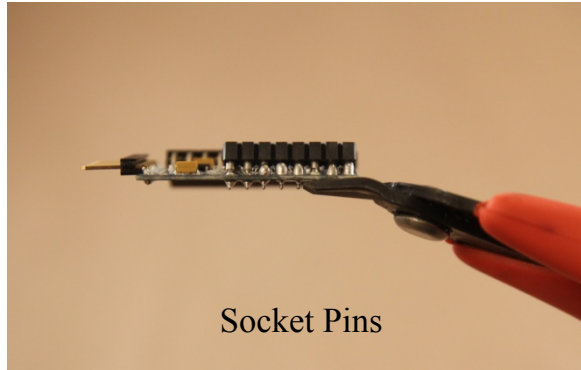
17. Place the board in a vise and solder the exposed socket pins.

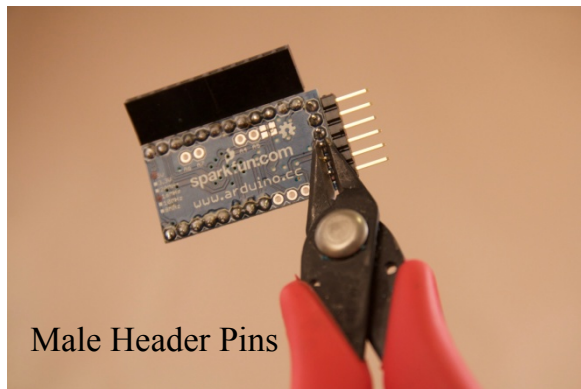18. Remove the tape and solder the remaining pins.
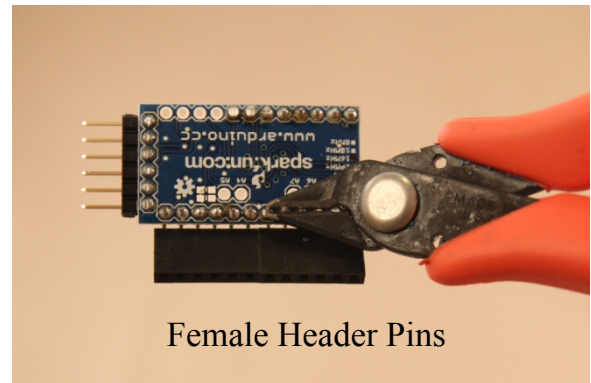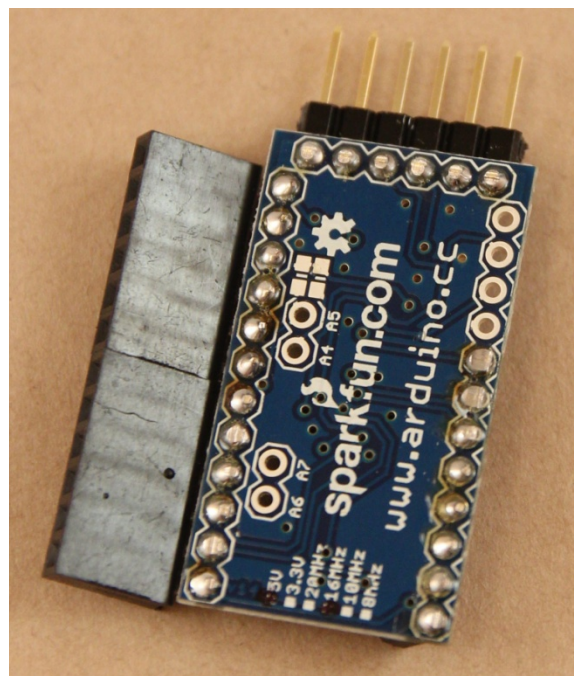
19. Check all solder joints.

Socket Pins

20. Use flush cutters to trim any excess pin material from the underside of all the solder joints. This allows the Pro Mini to more easily fit the contours of the buoyancy engine.
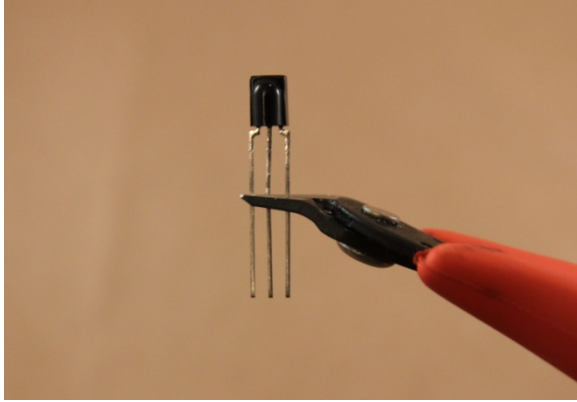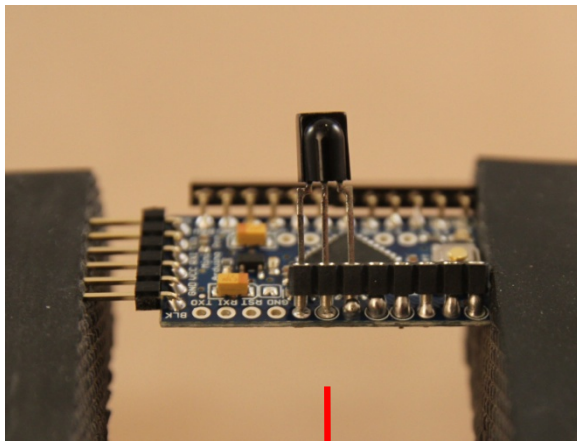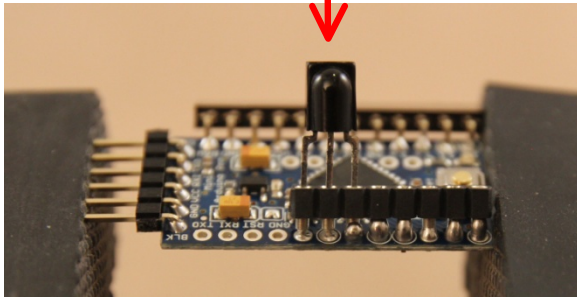

Male Header Pins

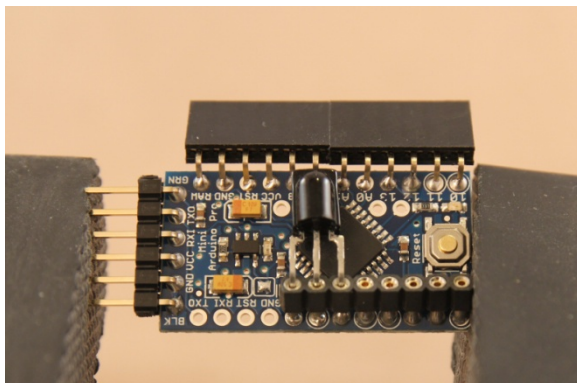Female Header Pins

Trimmed Solder Joints

21. Prepare the IR Receiver for attachment to the Pro Mini Board by cutting the leads in half.

22. With the board secured upright, orient the IR Receiver with the photo detector "bump" outward and the leads aligned with the first three sockets in the socket pin row as shown.

23. Press the IR Receiver firmly in place.

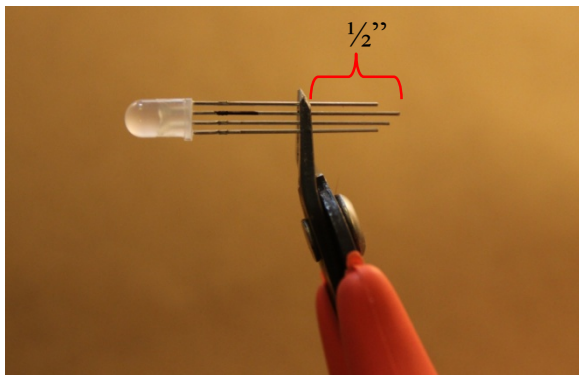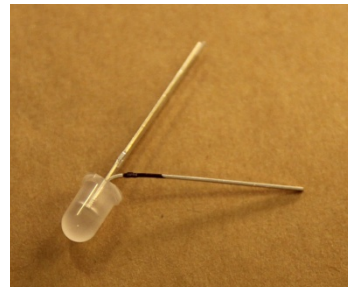24. Bend the IR Receiver nearly flat against the Pro Mini Board. Done!
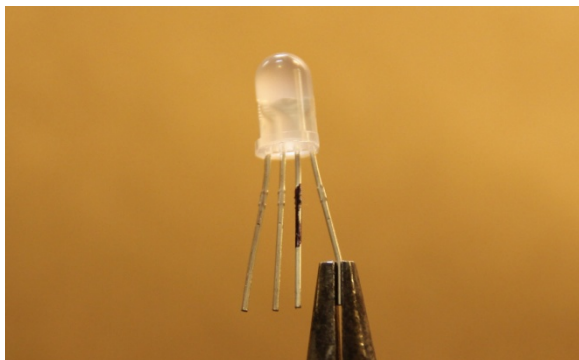
    Next: The RGB LED.

25. Locate the RGB (tri-color) LED and identify the longest lead which will be the common ground for the LED.
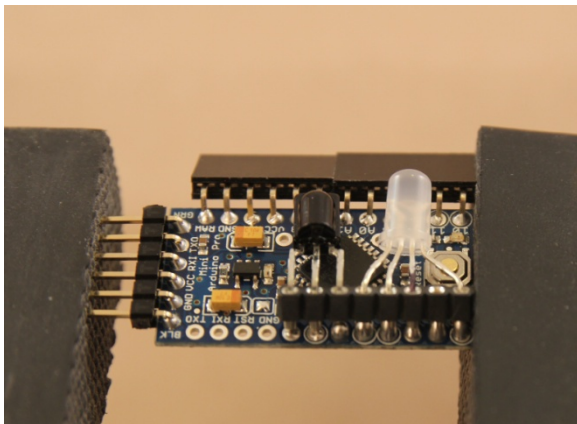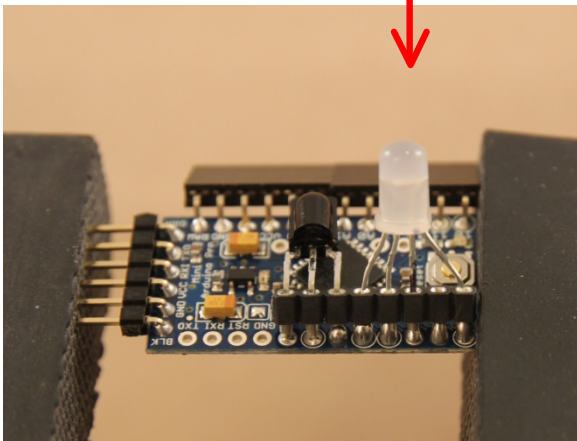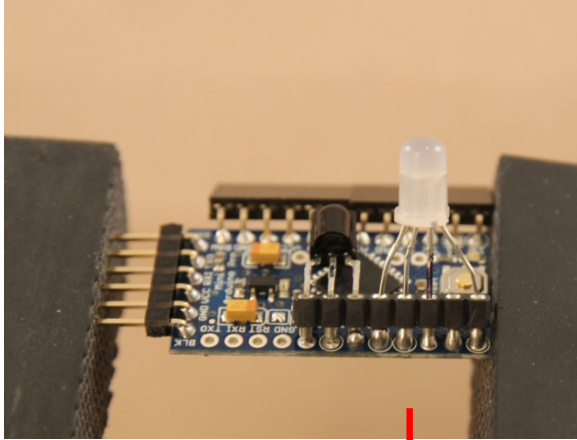

26. Bend this lead away from the others and mark it with a black marker.


½"

27. Clip all leads approximately 1/2" as measured from the longest pin.

28. Separate the leads and use needle nose pliers to bend the outer most wire (adjacent to marked lead) as shown. The tips of leads should roughly be parallel to one another.

29. Fit RGB LED into the open socket pins next to the IR Receiver as shown. Notice that the socket that is second from the right is unoccupied.
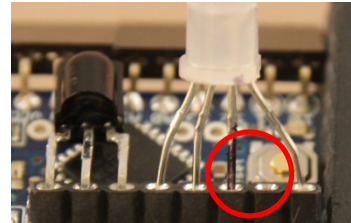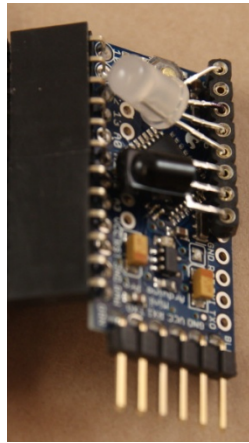

The marked lead should be at socket #7 (as marked on the Arduino) adjacent to this empty opening.

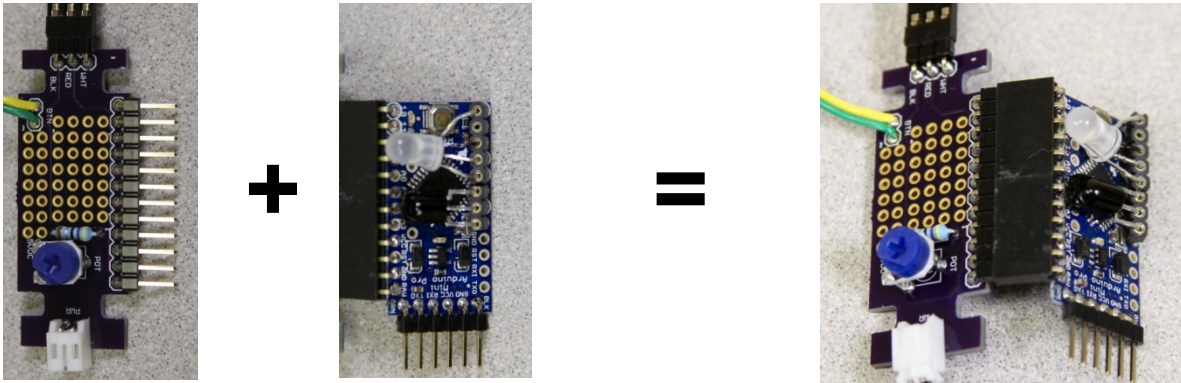When the LED is aligned and matches the photos, press it firmly into place.

30. Bend the RGB LED so that the bulb nearly touches the Pro Mini board as shown.
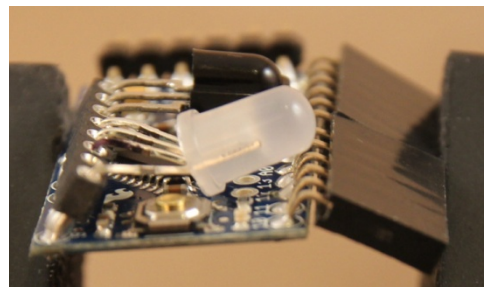
Done with the Pro Mini Board Build!

To assemble the final buoyancy engine controller, connect the Printed Circuit Board from instruction #4 to the female header pins on the Pro Mini Board Build.

Make sure no power is connected and that the header pins align one-to-one in the orientation shown. Then press them firmly together.
WARNING: Mal-alignment can COOK your electronics.
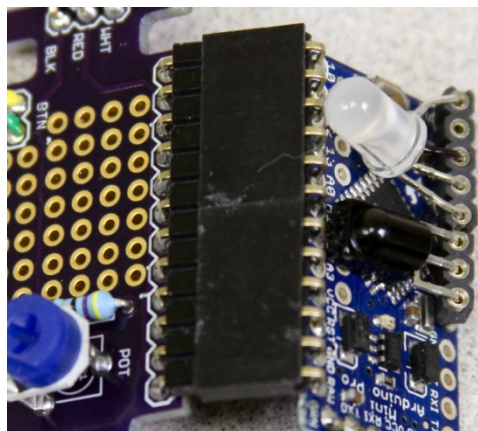
Finished Buoyancy Engine Controller!