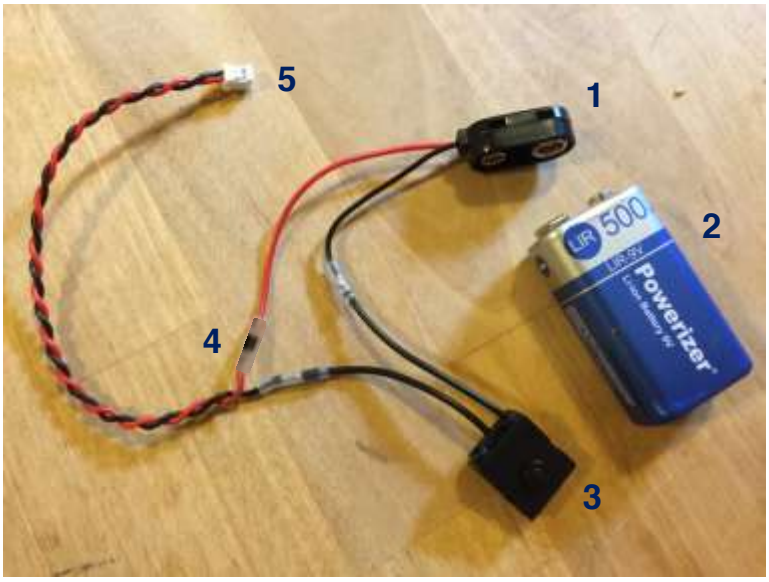
1. Power Supply and Limit Switch



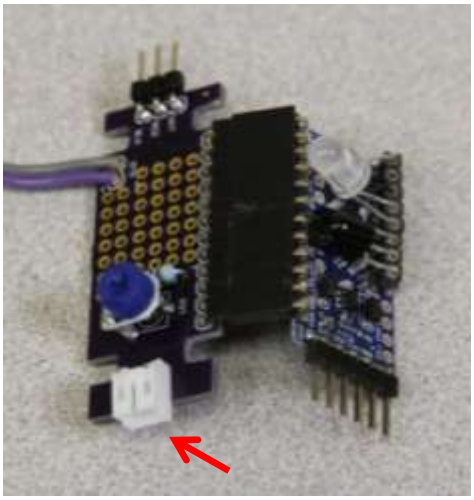
The power supply provides 8.4 volts of direct current to the buoyancy engine controller where the voltage is reduced to approximately 7 volts by a resistor. The power supply includes a snap connector, 9 volt rechargeable Lithium battery, pushbutton power switch, and an inline protection diode.

The power supply also includes a plug that connects to the buoyancy engine controller by sliding into the power supply jack on controller's circuit board.

The main components of the power supply are:

1. BATTERY SNAP CONNECTOR – Connects battery to power supply circuit.
2. LITHIUM BATTERY – Provides 8.4 volts of rechargeable power.
3. PUSHBUTTON POWER SWITCH – The ON/OFF control for the circuit.
4. PROTECTION DIODE – Allows current to flow in one direction in the circuit, but not the other.
5. POWER SUPPLY PLUG – Provides power to the buoyancy engine controller by plugging into the power supply jack.

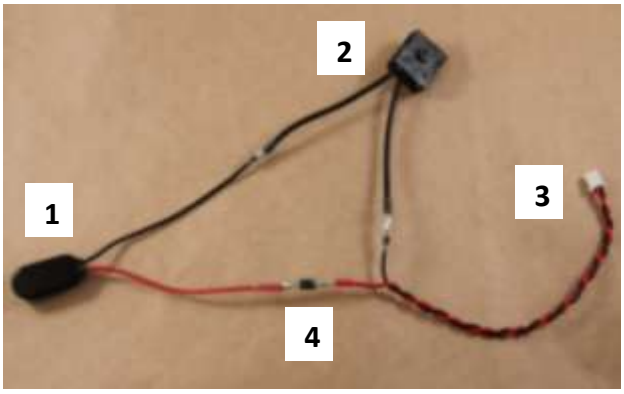
Buoyancy Engine Controller



Power Supply Jack

To solder together the power supply circuit, please see the instructions below.

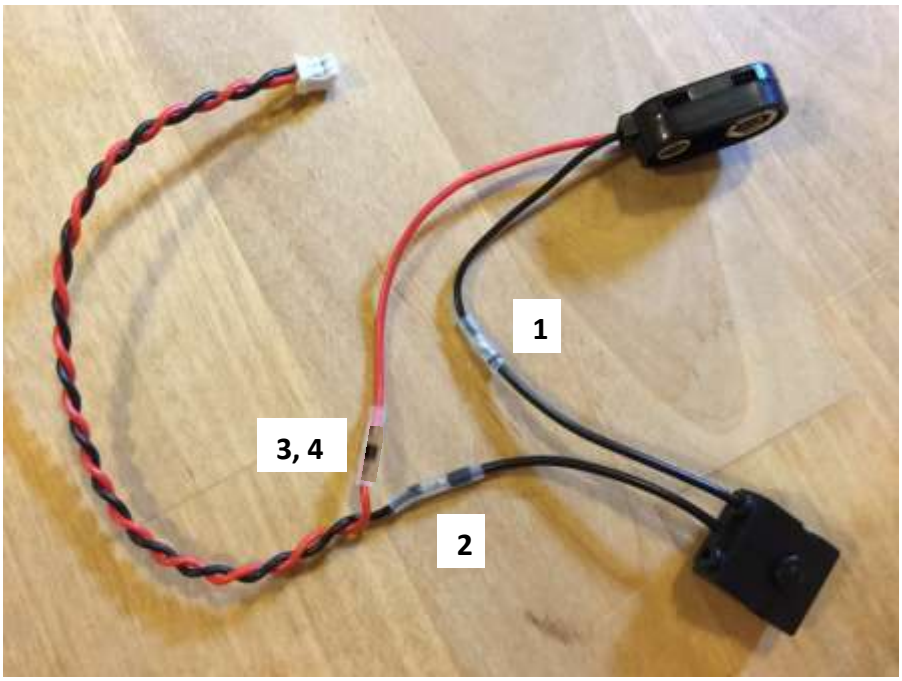
Power Supply Build with Diode & Pushbutton Limit Switch



1. The power supply circuit includes a 9 volt snap connector (1), pushbutton power switch (2), JST pigtail (power supply plug) (3), and diode (4).

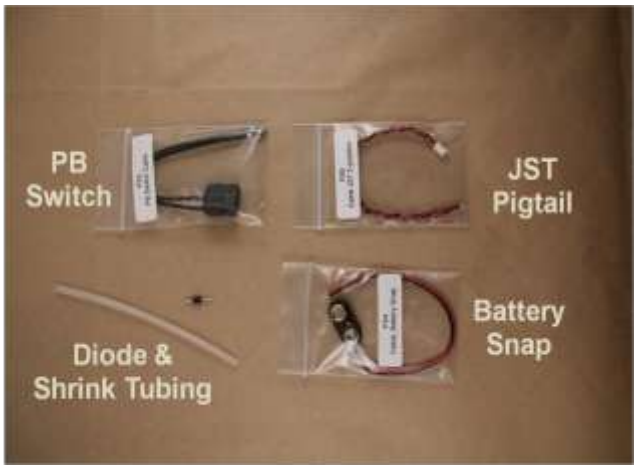
Safety Glasses/Goggles Required

Power Supply Circuit

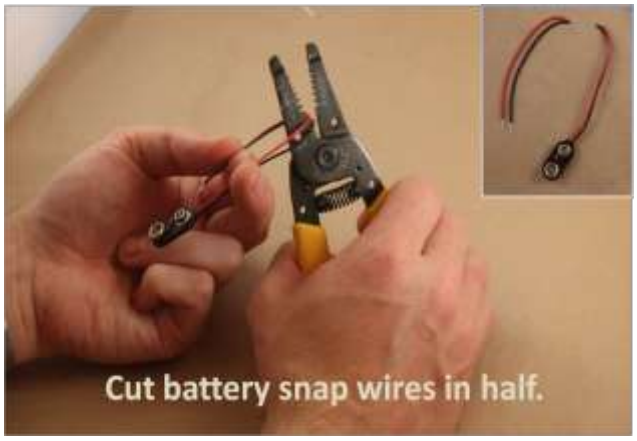


There are four solder joints that need to be insulated with shrink tubing:

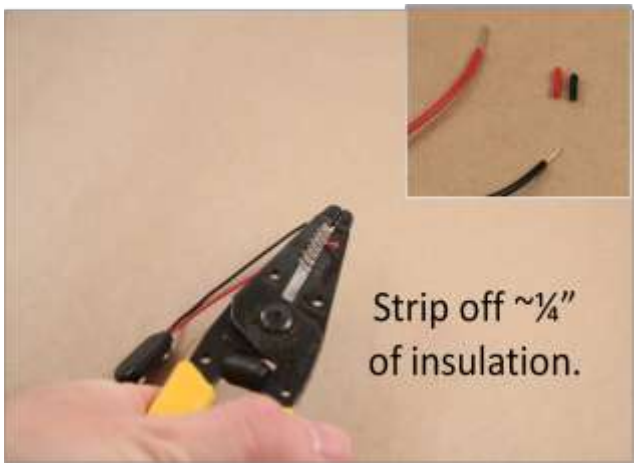
1. **Black** wire of 9V snap connector to **black** wire of pushbutton.
2. **Black** wire of pushbutton to **black** wire of JST pigtail.
3. **Red** wire of JST pigtail to inline diode and (4) inline diode to **red** wire of snap connector.



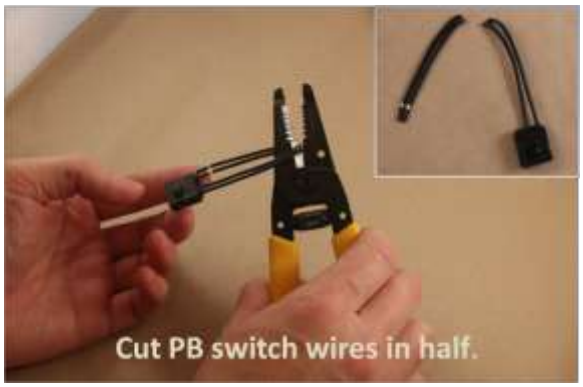
2. Gather these parts from the Power Supply & Limit Switch bag in the SeaGlide kit.



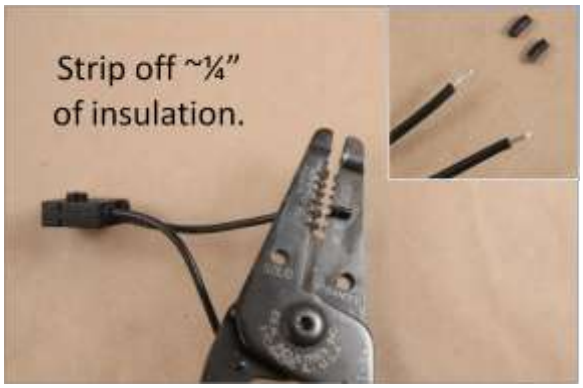
3. Prepare 9V battery snap connector for soldering by cutting wires in half.



4. Strip approximately ¼" of plastic insulation from the battery snap wires to expose metal strands.

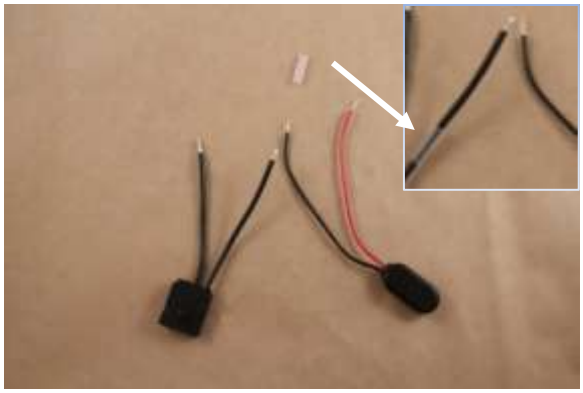


5. Cut pushbutton switch (PB switch) wires in half.

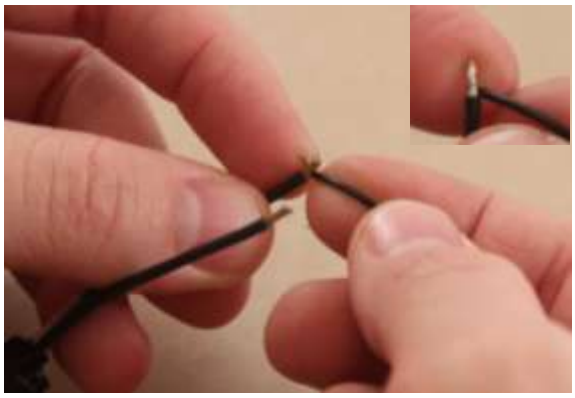


6. Strip approximately ¼" of plastic insulation from PB switch wires to expose metal strands.

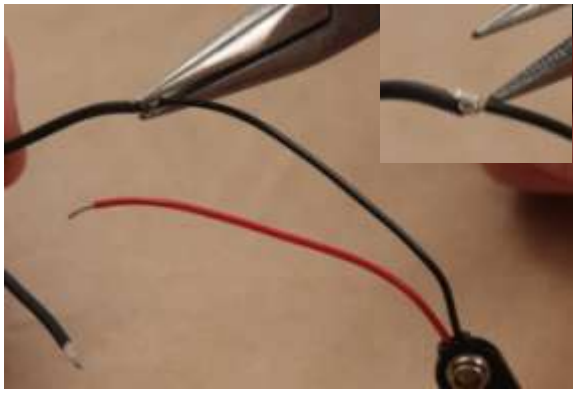
7. Cut off a ⅜" to ½" piece of heat-shrink tubing. The tubing will be used to reinforce the solder joint between two black wires of the PB switch and battery snap as well as help prevent an electrical short circuit.



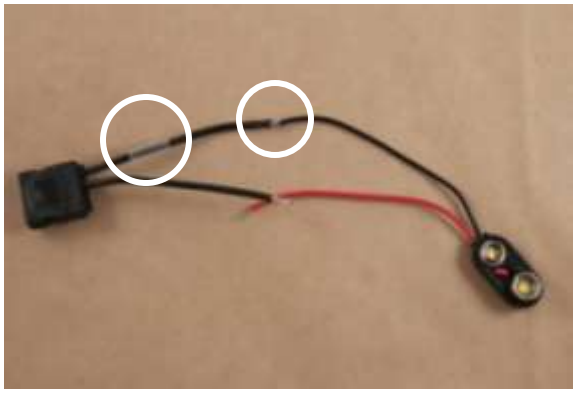
8. Prepare to solder the black wire of the battery snap to one of the black wires on the PB switch (either one will work). Slide the shrink tubing onto one of the wires that will be joined.



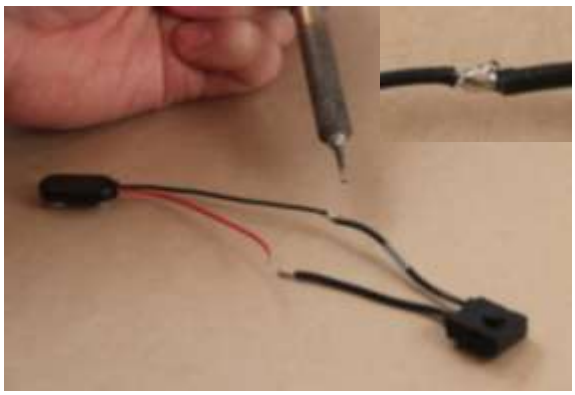
9. After ensuring that the shrink tubing is in place, twist the metal strands of the wires together.



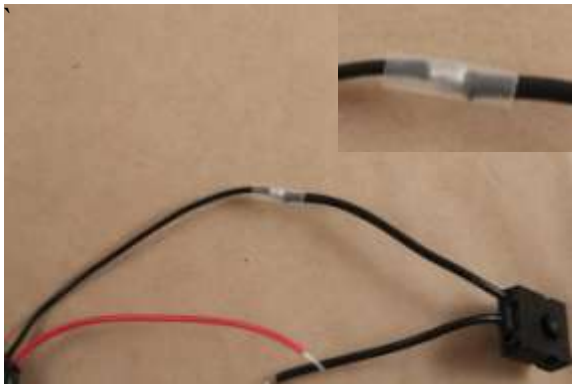
10. Compress the twisted wires flat with needle nose pliers.



Ready for Soldering: Two Black Wires Twisted together with Shrink Tubing Inline



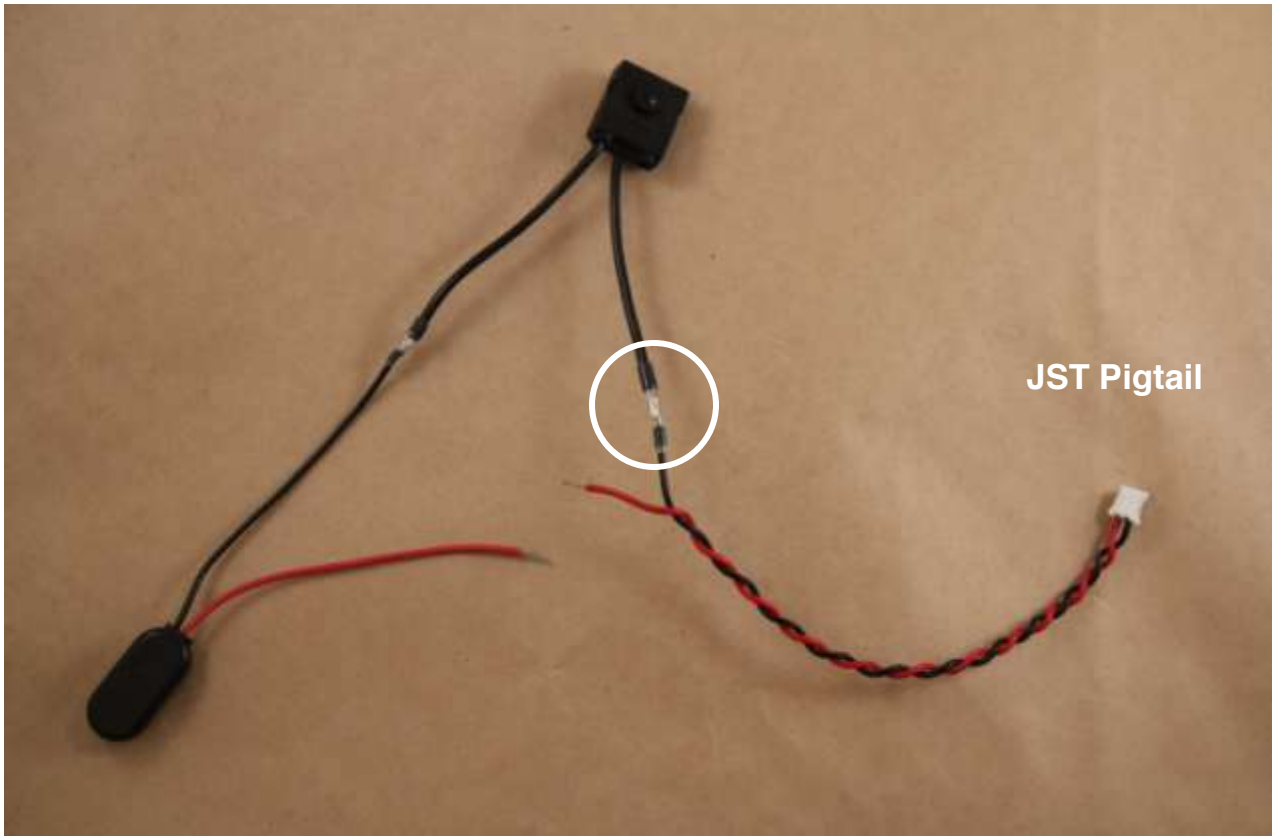
11. Solder wires together.



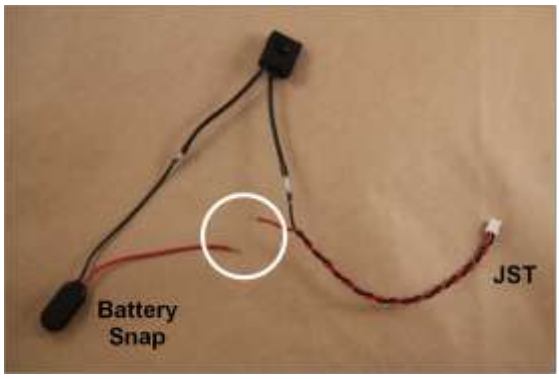
12. Slide the shrink tubing over the solder joint.

13. Use a heat gun to shrink the tubing around the solder joint. (Follow manufacturer's safety instructions.)

14. Repeat the process above and join the remaining black PB switch wire with the black wire on the JST pigtail. Don't forget the **shrink tubing**.

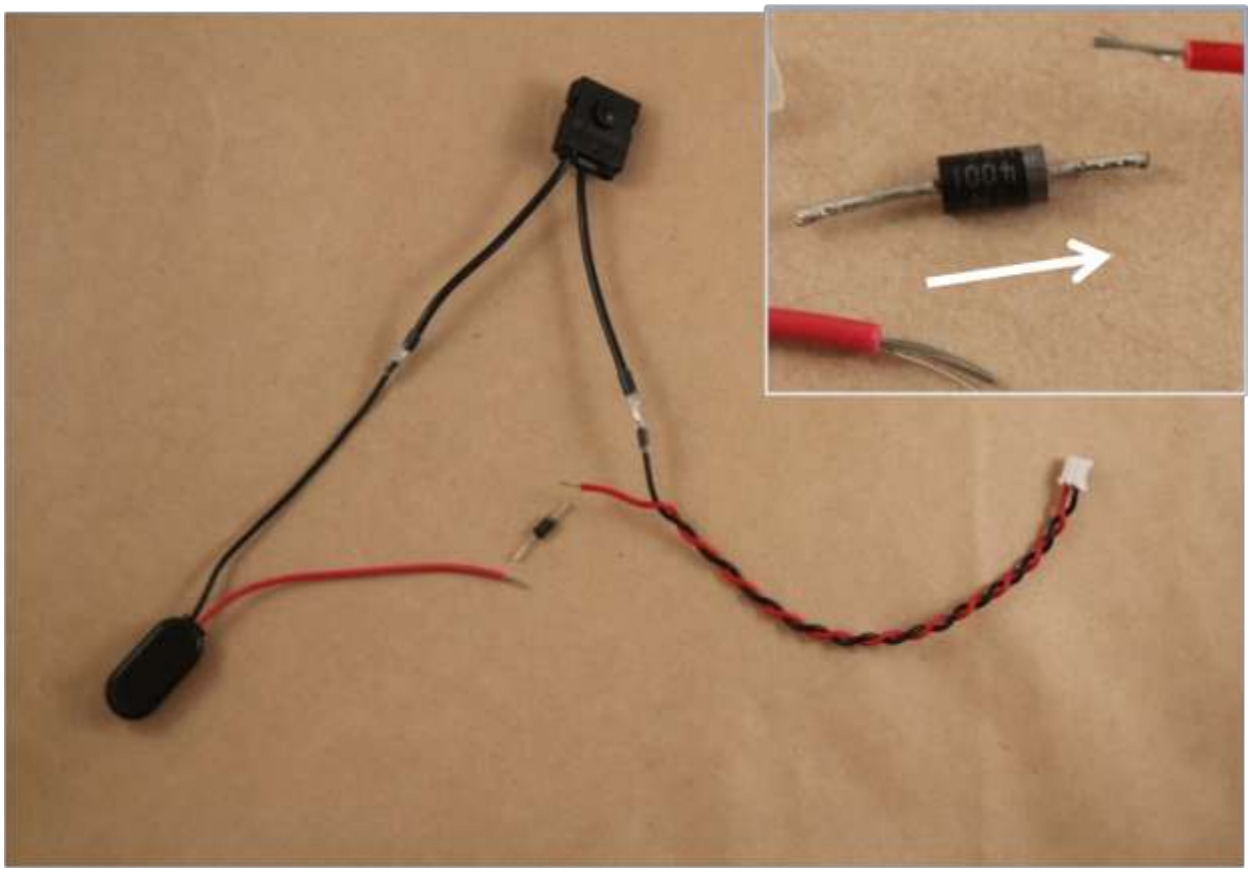


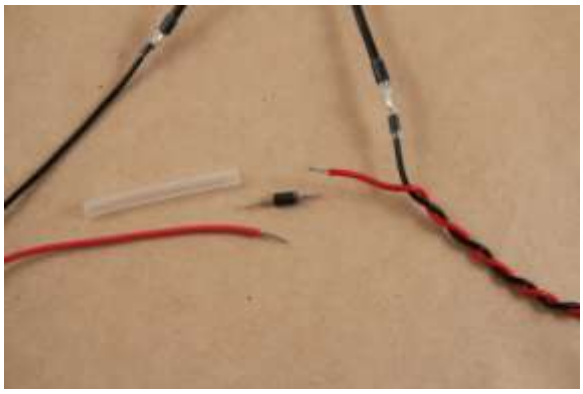
Add Diode to Power Supply Circuit



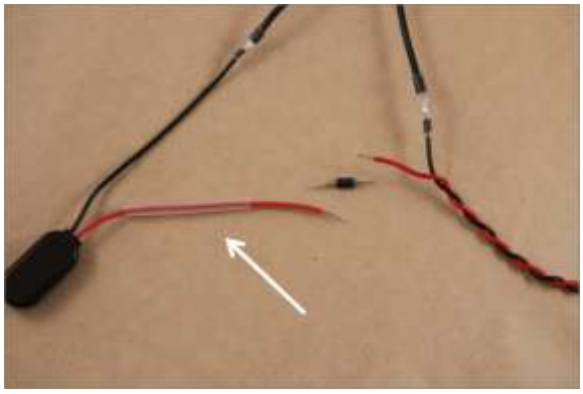
15. The protective diode goes between the battery snap and the JST pigtail to ensure that electrical current can only flow in the correct direct.

16. The grey band on the diode **must be** positioned towards the JST pigtail.

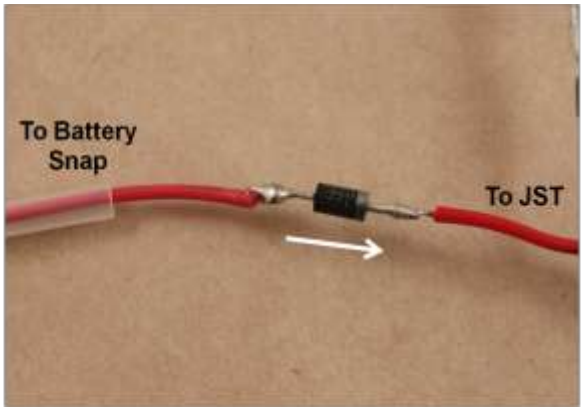




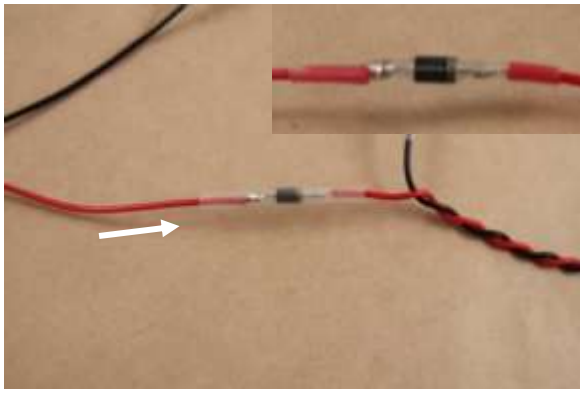
17. Use heat-shrink tubing.



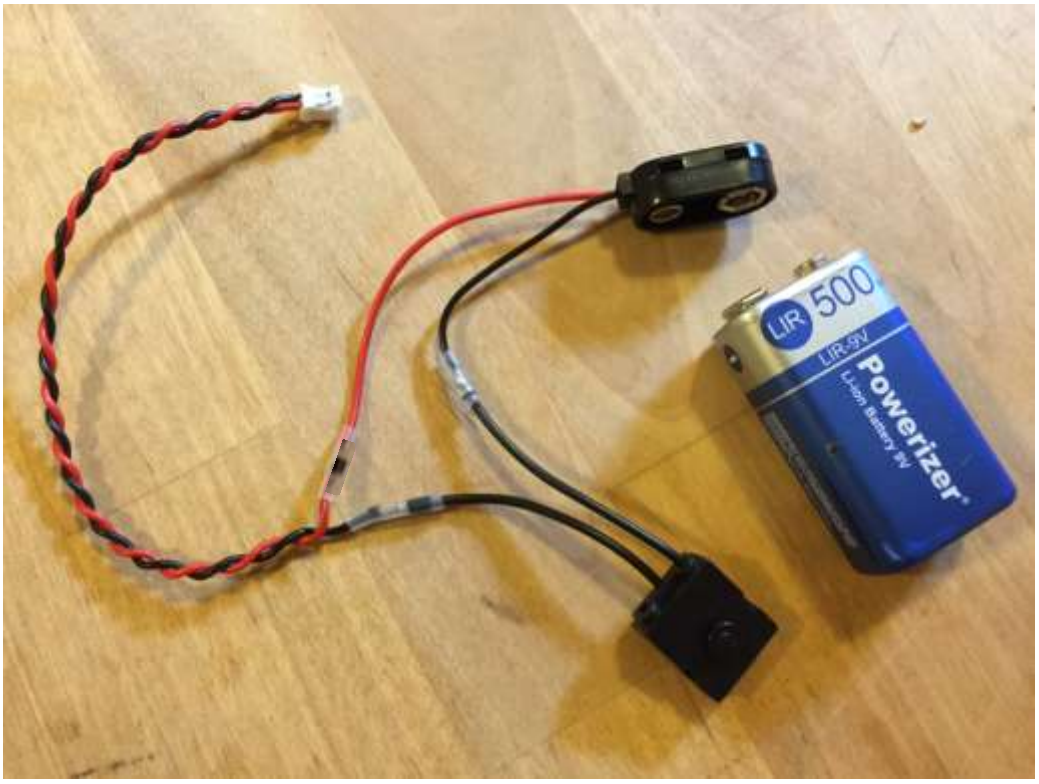
18. Position the tubing on the longer red battery snap wire prior to soldering.



19. Use electrical tape or a vise to hold wires in place then solder the diode in position with the grey band facing the JST connector.



20. Slide heat-shrink tubing over the solder joints and diode. Use a heat gun to shrink the tubing.



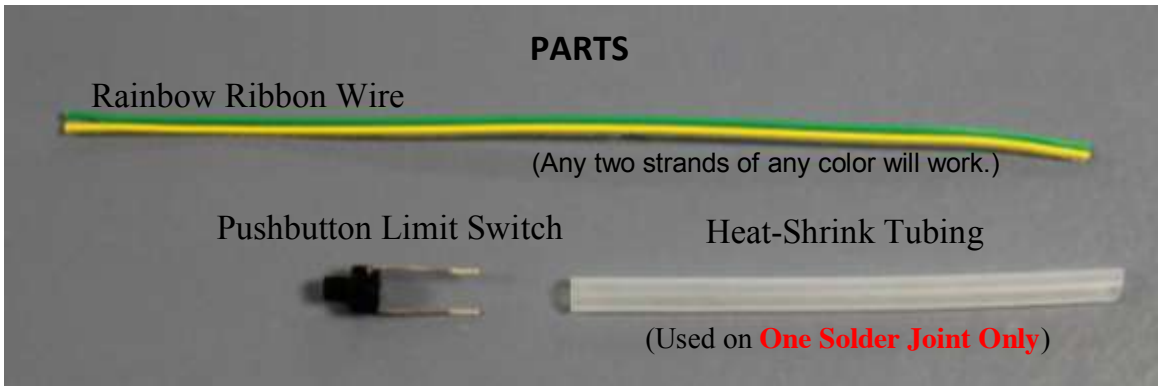
Power Supply Circuit with 9 Volt Lithium Rechargeable Battery

Looks good! More fun ahead!

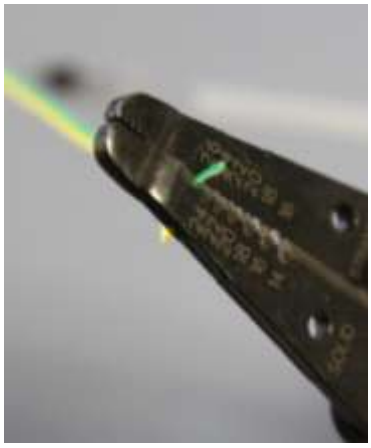
You can charge you battery with the Smart Charger included in your SeaGlide Kit. Read and follow the Operating and Safety Instructions provided with the charger. (Be sure to only use an appropriate lithium-ion battery smart charger.)

When charged, set the battery aside for later use testing the Buoyancy Engine.

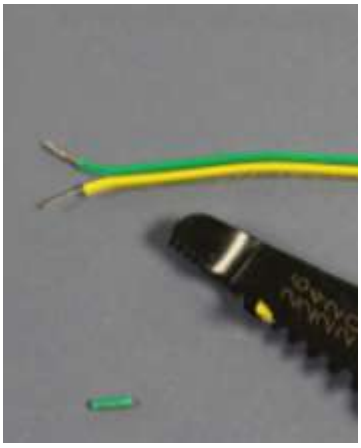
While your soldering iron is hot, you may as well prepare the Pushbutton Limit Switch. This will be needed in the next set of build instructions – #2 Buoyancy Engine.



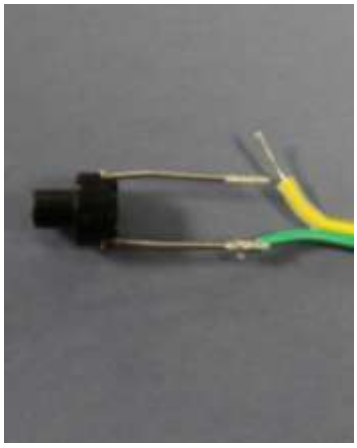
Strip Wires



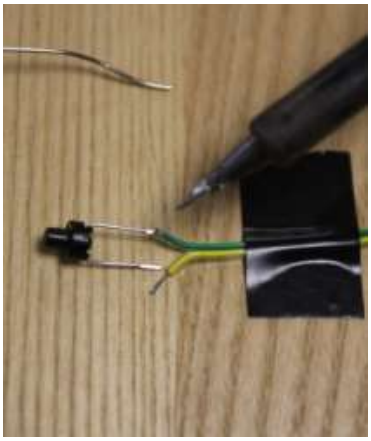
Remove ~¼" of Insulation



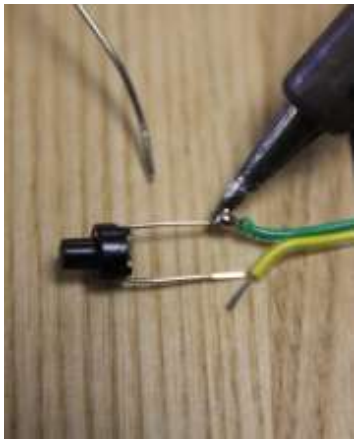
Wrap one Wire around a Pin



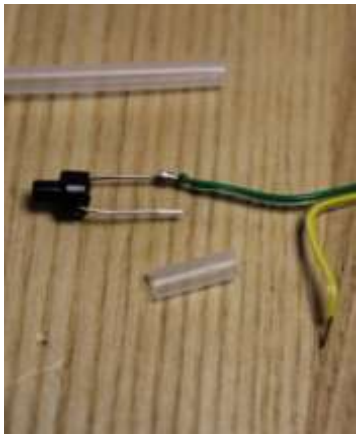
Secure Wire



Solder



Use Shrink Tubing
Only on One Wire



Wrap Wire around Pin

Solder

Position Tubing and Shrink

Save the Wired Pushbutton Switch for the Buoyancy Engine Build

The pushbutton switch will act as a “Limit Switch”* in the buoyancy engine to prevent the travel of the cylinder plunger from crashing into the servo. It provides a reliable position at which the cylinder plunger will change direction… You’ll see.

*Prevents the travel of an object in mechanism past a predetermined point.