Trouble Shooting

Use this guide to trouble shoot your EPro8 Electronics circuits.

Step 1: Charge the Battery

Some of the electronics components don't perform correctly if the battery is not fully charged.

Step 2: Electronics Rules

There are two rules with the EPro8 Electronics. Check that your wiring matches these rules:

- Always match colours
- Any red or black sockets must be wired back to the battery

Note, this circuit below is incorrect. All the red sockets have cables in them, but the right hand button and the direction box are <u>not</u> wired back to the battery.
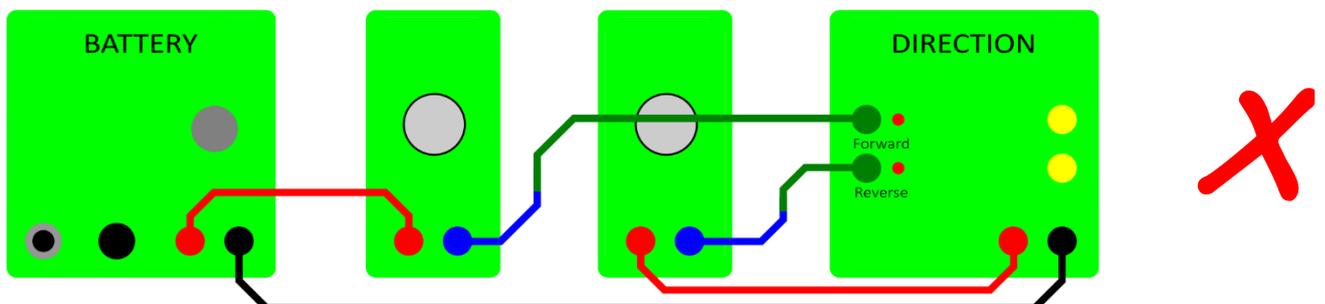
The red and black cables are the power supply cables. As long as they are wired to the battery, then you don't need to think about these.

They don't need to wired directly to the battery. They can be wired via the multibox or via another cable.
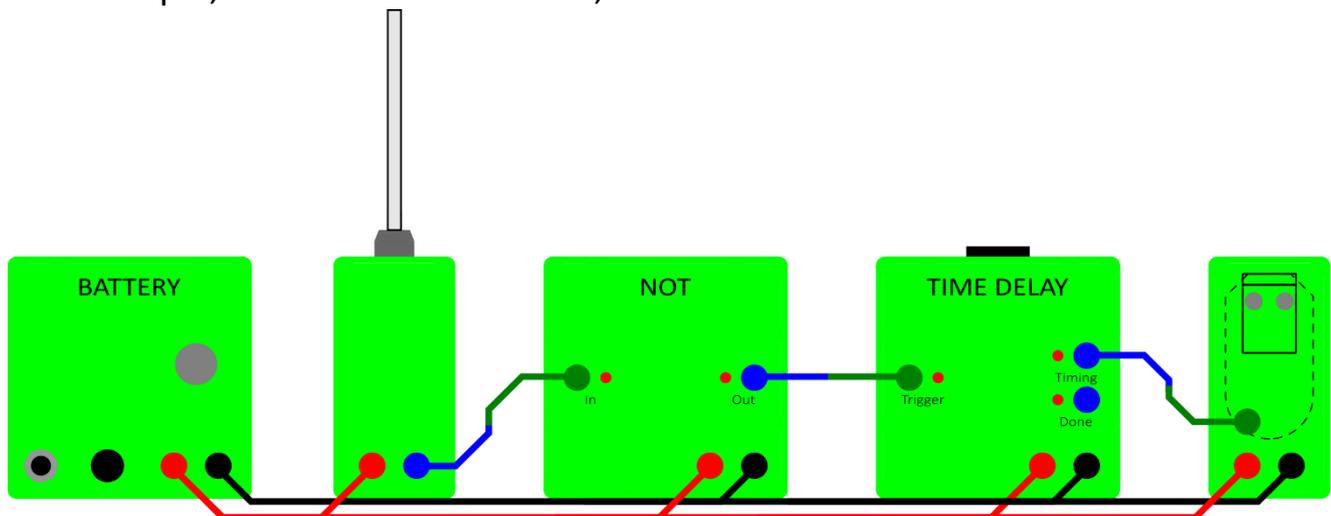
Step 3: Trace the Signal

The blue green cables are the signal cables. They take an input, and either connect it directly to an output, or to one or more logic boxes

For example:

Input		Logic Box		Output
Switch		→		Light
Light Sensor		→		Fan
Laser	→	ON/OFF	→	Buzzer
Button	→	DIRECTION	→	Motor
Limit Switch → NOT	→	TIME DELAY	→	Ram

The LEDs on each box indicated the status. Trace a signal through to see where the problem is.

For example, the last item in the list, should look like this:

To trace the signals in this circuit:
- Turn on the battery
- Press the limit switch
- Check that the signal from the limit switch has reached the NOT box (as seen by the In LED
- The NOT box does the opposites. So the Out LED should be off.
- Release the limit switch.
- The Out of the NOT should now be on.
- Trace that signal to the TIME DELAY trigger (this LED should be on)
- The Timing LED should be on while the box is timing.
- This should extend the ram.

Step 4: Remove all Blue Green Cables

A typical solution will only have three or four blue / green cables. Students often just add more and more cables without thinking about what they are for.

Remove all the blue / green cables.

Add them back, one at a time, starting from the input device.
After adding each cable, check the circuit does what was expected.

Step 5: Check Equipment

If there is a piece of equipment that you suspect is faulty, build the following basic circuits to check the equipment:

Blue / Green Cable

Construct a test rig using this circuit.
Confirm light is on.
Note: this breaks the colour matching rule, but this will isolate if the cable is the issue.

Button
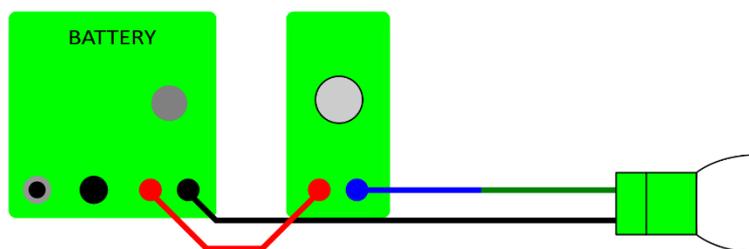
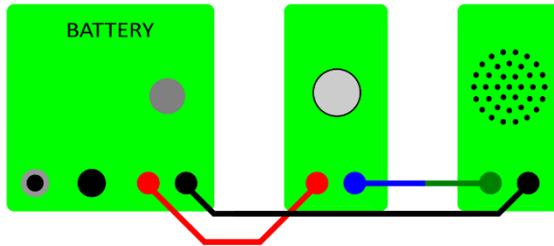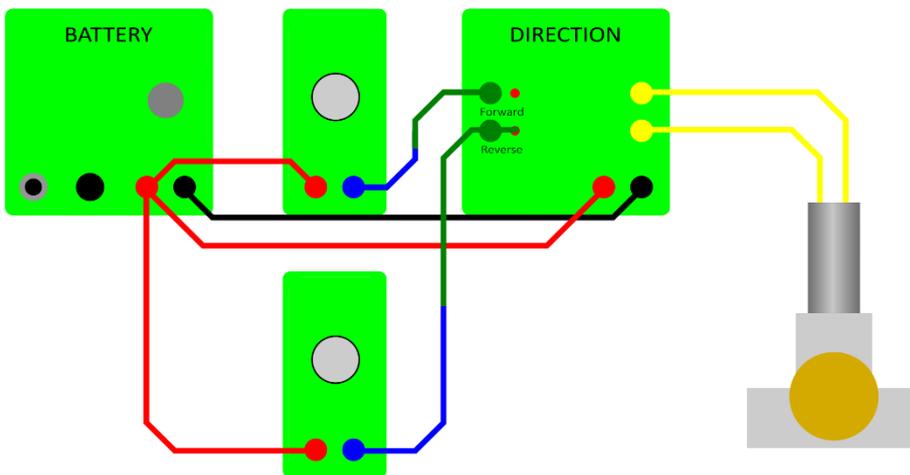
Press button.
Confirm light is on.
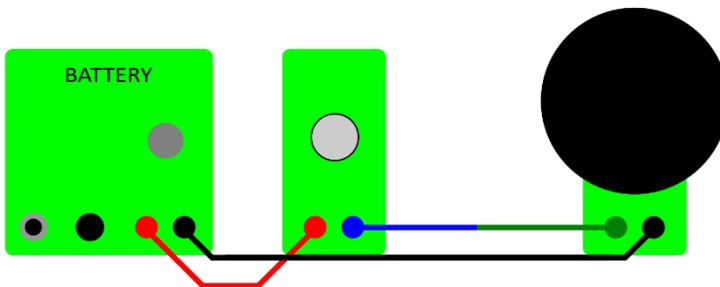Release button.
Confirm light is off.

Buzzer

Press button.
Confirm buzzer sounds.
Release button.
Confirm buzzer silent.

Direction

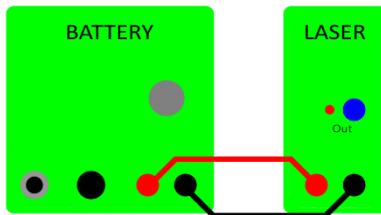Press button 1.
Check motor moving.
Press button 2.
Check motor moving in opposite direction.

Fan

Press button.
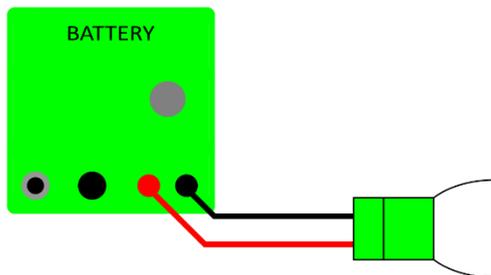Confirm fan is blowing.

Laser

Point laser away from objects
Confirm LED is off.
Place object (eg hand) in beam approx 100mm in front of laser.
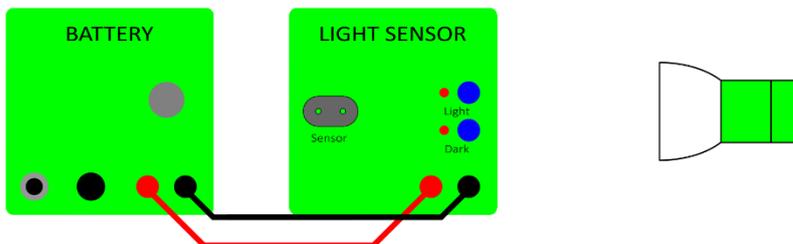Confirm LED is on.

Light

Connect light to battery.
Confirm light is on.
Note: this breaks the colour matching rule, but this will isolate if the light is the issue.
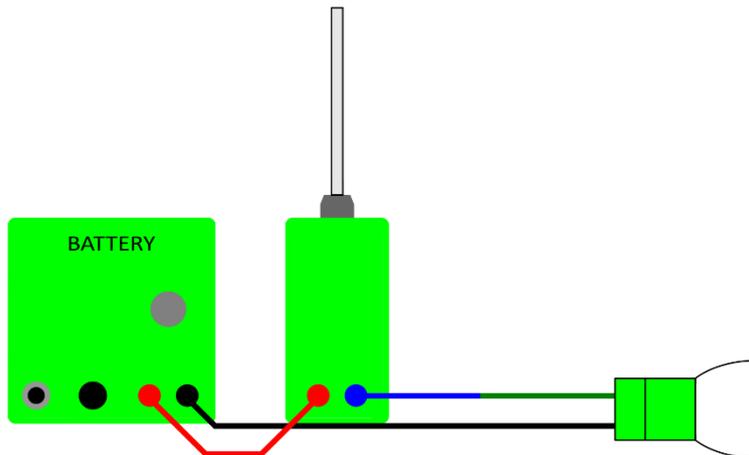
Light Sensor

Shine a light at light sensor from approximately 300mm away.
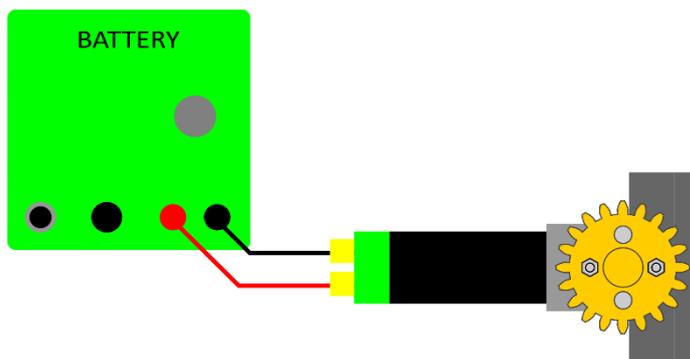Confirm "Light" indicator showing.
Remove light.
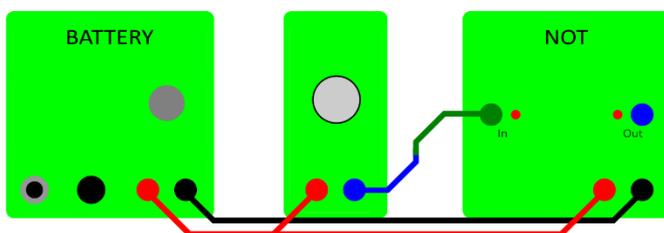Confirm "Dark" indicator showing.

Limit Switch

Push on limit switch.
Confirm light is on.
Release limit switch.
Confirm light is off.

Motor

Wire this circuit and check the motor rotates.
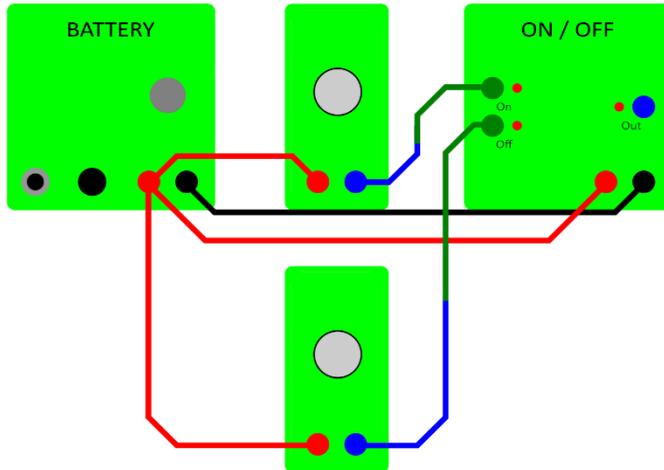Note: this breaks the colour matching rule, but this will isolate if the motor is the issue.

NOT

Press the button.
Confirm the "In" LED is on, and the "Out" LED is off.

Release the button.
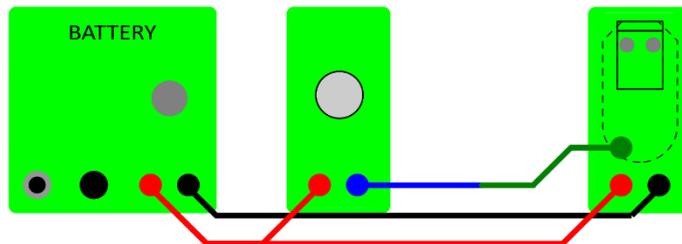Confirm the "In" LED is off, and the "Out" LED is on.

ON / OFF

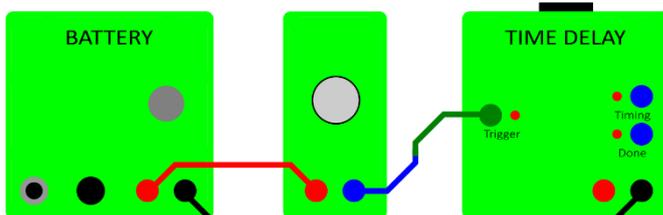Press and release button 1.
Confirm "Out" LED is on

Press and release button 2.
Confirm "Out" LED is off.

Ram

Press button.
Confirm fan ram extends fully.
Release the button.
Confirm ram retracts fully.

Time Delay

Set the dial to 4.
Press and hold the button.
Confirm "Timing" LED on for approximately 4 second
then "Done" LED turns on.
Release button.

Note: A flat battery will cause the time delay to function incorrectly.