

# Tin Foil Circuit Board

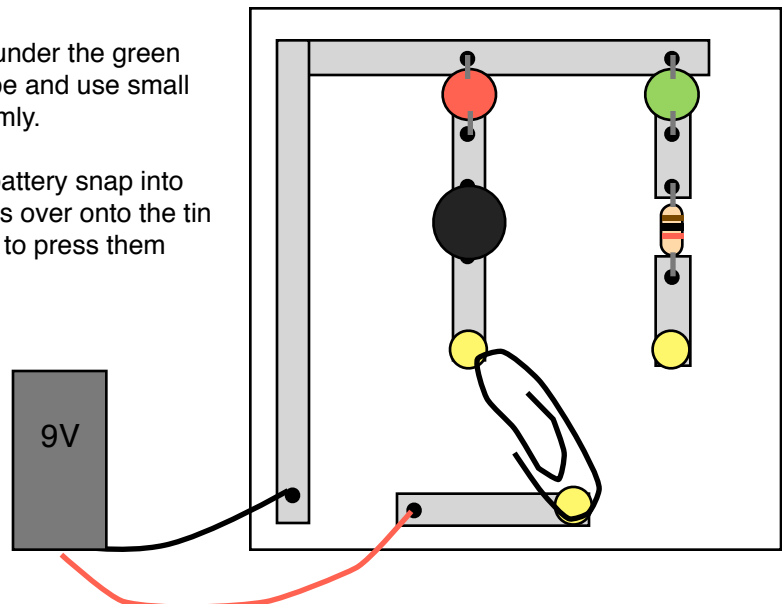
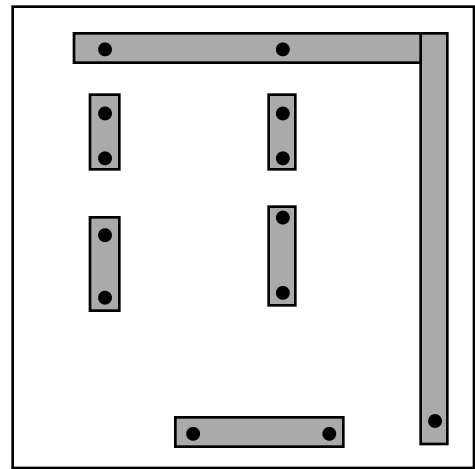
## How to Build It:

### Materials:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Tin foil tape                      | <input type="checkbox"/> Paper clip          | <input type="checkbox"/> Resistors - 1K                                    |
| <input type="checkbox"/> Cardboard (cut in 4" x 4" squares) | <input type="checkbox"/> Red and Green LED   | <input type="checkbox"/> Scissors  |
| <input type="checkbox"/> Brad fasteners                     | <input type="checkbox"/> Buzzer              | <input type="checkbox"/> Awl, X-acto knife, or other tool for poking holes |
|   | <input type="checkbox"/> 9V battery and snap |  |

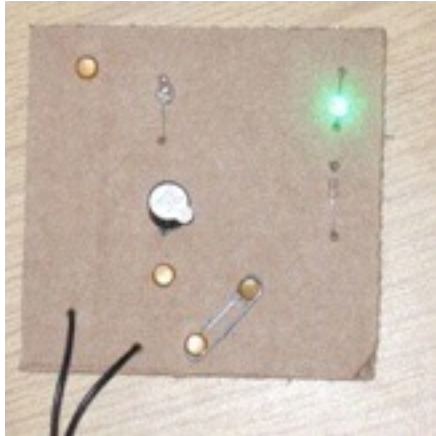
### Procedure:

1. Transfer the circuit board pattern onto the cardboard:
2. Cut strips of tin foil tape to the right length and press them down firmly on the circuit board pattern.
3. Poke holes (black dots) in the circuit board using a sharp tool (awl, x-acto knife, sharp pencil etc.)
4. Insert brad fasteners through the blank cardboard side so the legs stick out onto the side with the tin foil tape.
5. Insert LEDs into the circuit board so that the negative leg (short wire) is facing the top of the board. Red light on the left, green light on the right. Bend the legs over and use small pieces of tin foil tape to firmly press the legs down onto the piece of tape where the leg sticks out.
6. Insert the Buzzer under the red LED so that the negative leg is closest to the red LED and the positive leg is on the bottom side of the board. Bend the legs over onto the tin foil tape where they stick out and use small pieces of tape to press them down firmly.
7. Insert the 1K (brown, black, red) resistor under the green LED. Bend the legs over onto the tin foil tape and use small pieces of tin foil tape to press them down firmly.
8. Insert the black (negative) wire from the battery snap into the corner of the circuit board. Bend the legs over onto the tin foil tape and use small pieces of tin foil tape to press them down firmly.
9. Insert the red (positive) wire from the battery snap into the circuit board by the triangle of brad fasteners that will become the switch. Bend the legs over onto the tin foil tape and use small pieces of tin foil tape to press them down firmly.
10. Slide a paper clip under the bottom

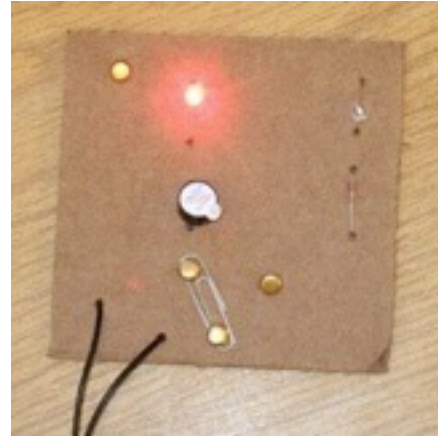


point of the triangle. The paper clip should be able to swing back and forth between the other two brad fasteners to turn on the green and red light/buzzer.

11. Attach the battery and test! What can you use the Tin Foil Circuit Board for? What can a red and green light be used for? True/False, Stop/Go etc.



Go / True



Stop / False

## How it Works:

There are two series circuits, in parallel on this circuit board. The switch turns on only one series circuit at a time, but could turn on both, in parallel, at the same time if we used two paper clips. The Green circuit includes the resistor and green LED while the Red circuit includes the buzzer and the red LED. LEDs can only handle about 3V of electricity so the Green LED needs the resistor to prevent the light from burning out. The red light doesn't need a resistor because the Buzzer provides enough resistance that the LED won't burn out. We use 9V instead of 3V because the Red light circuit with the Buzzer does not turn on with only 3V of electricity.

When we build this circuit board, we put the components in on the side without the tinfoil just like we would do on a normal circuit board with etched copper lines. This makes it so the legs of the components stick out on the side where the electricity is moving through the etched pattern and makes it easier to attach all the components securely and in the correct places.

## Experiment!

What happens when you touch the switch for both red and green lights?

How could you use a manufactured switch?

What other purpose could the Red/Green light serve?