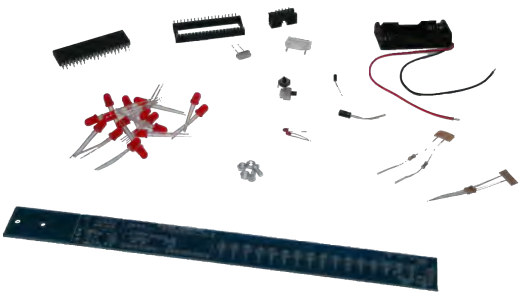
LED Shaker



Activity overview description:

This circuit is a super interactive project, creating light trails and symbols at parties and festivals with this cool shake stick.

Learning outcomes:

Young people will:

- Research the flow of electricity and report findings back to the group
- Create test circuits and learn how to adopt a tinkering mindset
- Create prototype plans and discuss with the group for feedback
- Learn how to solder circuits
- Reflect on design and iterate to improve the design and functionality

Skills & Competencies

Young people will develop:

- Critical thinking and problem-solving skills
- Creativity and innovation skills
- Communication skills
- Collaboration skills

Equipment:

- Shake Stick Kit
- Soldering Iron
- Solder
- Wire Cutter
- 2x AAA Batteries

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Step-by-step Instructions

Step 1: LED's

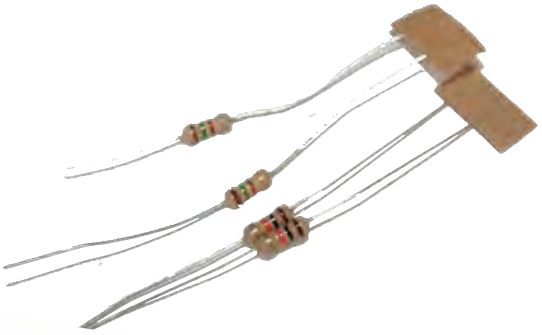
LED's have a short leg which is negative and long leg which is positive. Solder LED's into all of the marked points below, ensuring they are the matching the + and-.

Step 2: Solder the Resistors

Solder the three resistors where marked below, ensuring they match the strength markings:

2x Brown, Green, Red, Gold = 1500 = 1.5K

1x Brown, Black, Orange, Gold =10000 = 10k



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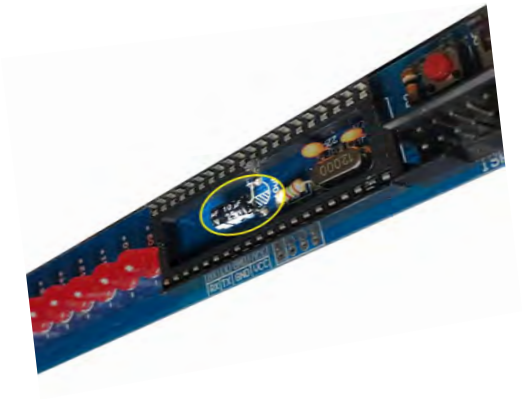
Step 3: Solder the Cylinder Capacitor

This capacitor will be underneath a chip that we will later solder to the board, in order to make room for this we must bend the capacitor so that it is lying flat with the circuit board as can be seen below before soldering into place. Also, take note of the + and - markings. The long leg is the positive and short leg is negative.

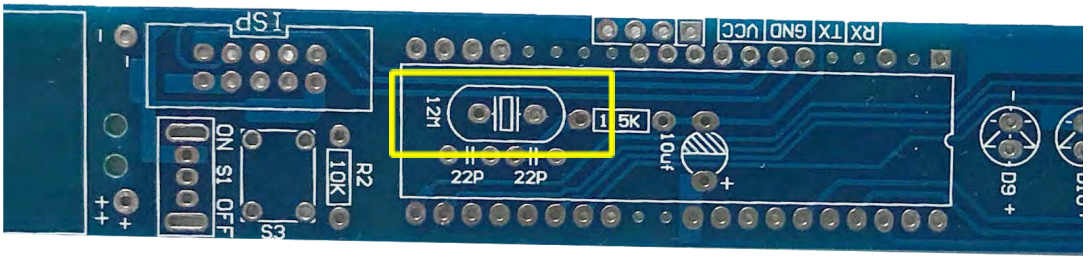


Step 4: Solder Discs

Solder the two 'orange disc' capacitors into 22p.

Step 5: Solder Oscillator

Solder the Oscillator into the '12M' slot shown below. There is no negative/positive side of this component.



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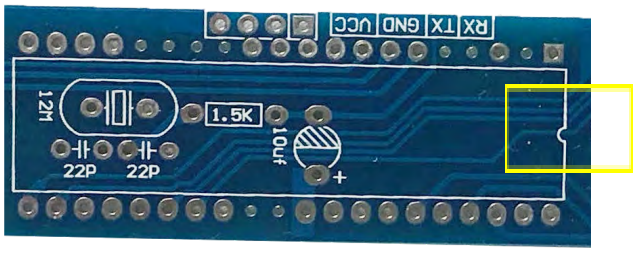
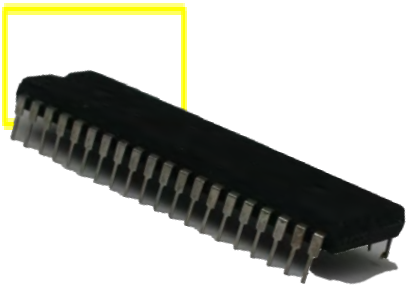
Step 6: Solder IC Socket

Solder the IC Socket into the 40pin slot shown below. There is no negative/positive side to this component, however, if you look at the red square below you will see a notch, this notch is also on one side of the component, these need to match or else our shake stick will not work.





Step 7: Place the IC into the IC Socket.

There is also a notch on the IC chip that needs to match up, the IC is delicate. Be very careful when inserting the IC chip, it is very easy to break one of the legs if one leg breaks, the shaking stick will not work.

Step 8: Solder the Vibration Switch into the 'S2' slot shown below.

There is no negative/positive side to this component however you will see that it needs to be placed into the metal coil side facing the row of LED's.

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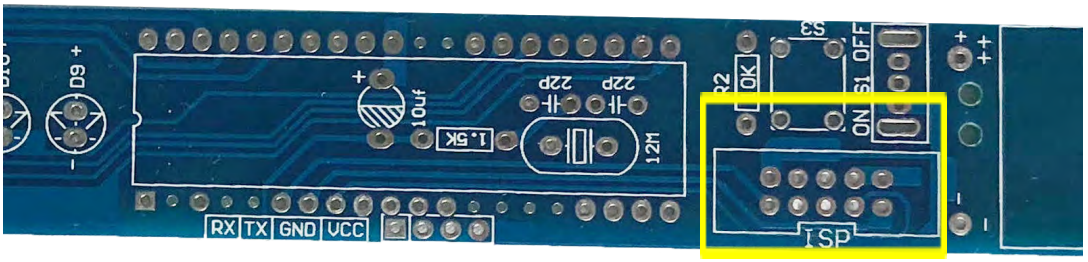
Step 9: Solder Diode Component

In this step, we will be soldering the diode component into the slot marked 'D18'. One side of the diode has a stripe that matches up with the markings on the D18 slot, we need to match these when soldering the diode in place.

Step 10: Solder Pins

In this step, we will be soldering the 'DC3 - 10 Pin' into 'ISP'. One side of this pin has a gap, solder the pin in place so that the gap is facing the outside of the shaker stick which should match up with the white markings.



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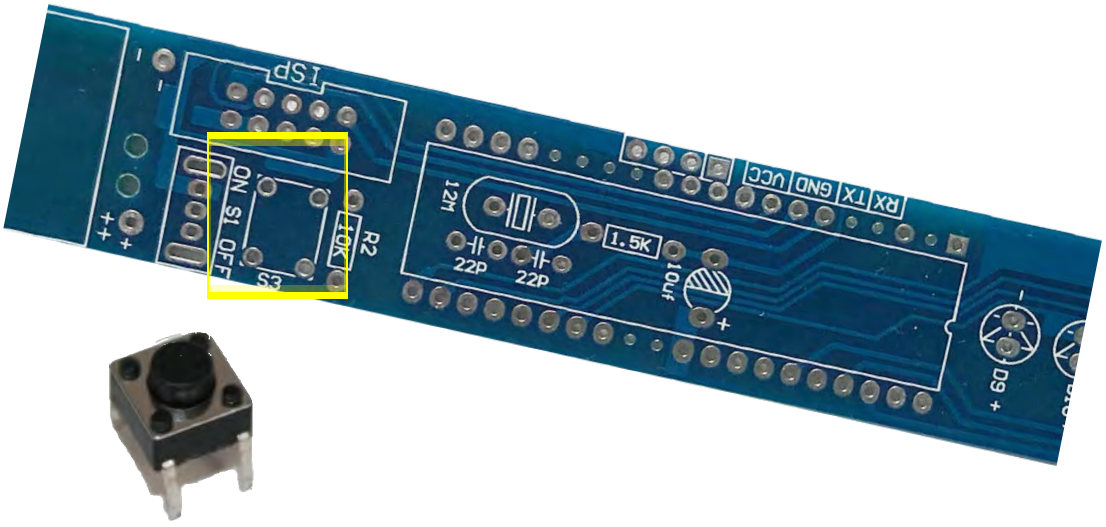
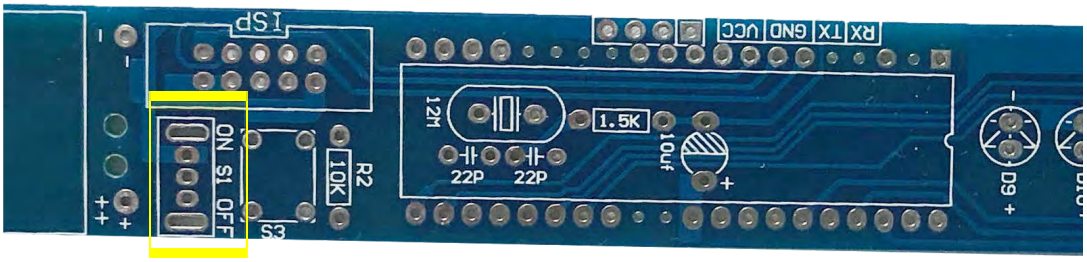
Step 11: Solder Tactile Switch

Next, we will be soldering the 'tactile switch' into 'S3'. This toggle switch has no positive/negative connections so it can be soldered in any way. The tactile switch will allow us to cycle through the different designs installed to the shaking stick.



Step 12: Solder Toggle Switch

In this step, we will be soldering the 'Toggle Switch' which will allow us to turn our shake stick on and off. There are no positive/negative sides to this switch.



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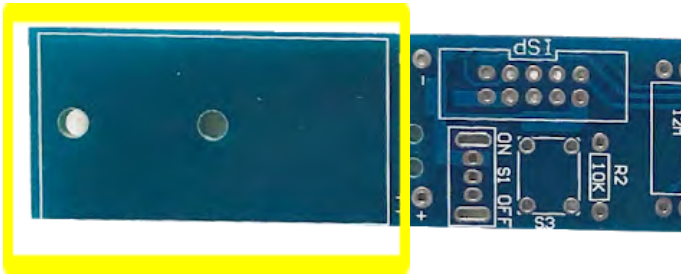
Step 13: Lastly, we need to add our battery case to the board.

Inside the kit, you will have received two screws and nuts to keep them in place, screw the battery case securely to the circuit board using the nuts to hold them in tight. Be careful not to tighten them too much or you could crack the circuit board. Now solder the red wire to the plus and the black wire to the minus, insert the batteries, turn it on and start shakin!



Step 14: Capture the magic!

Make a case or a place to hold your shake stick more comfortably and decorate it. *Be sure not to use any metal for your case.

Capture the magic of your LED Shake Stick on Camera!

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