

Synth Building

Soldering for Beginners

Building the Stepped-Tone Generator

by Nina Richards

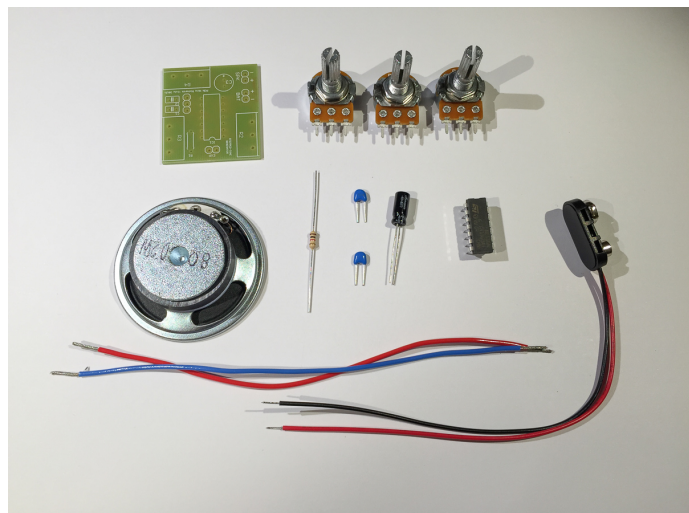
Produced for:

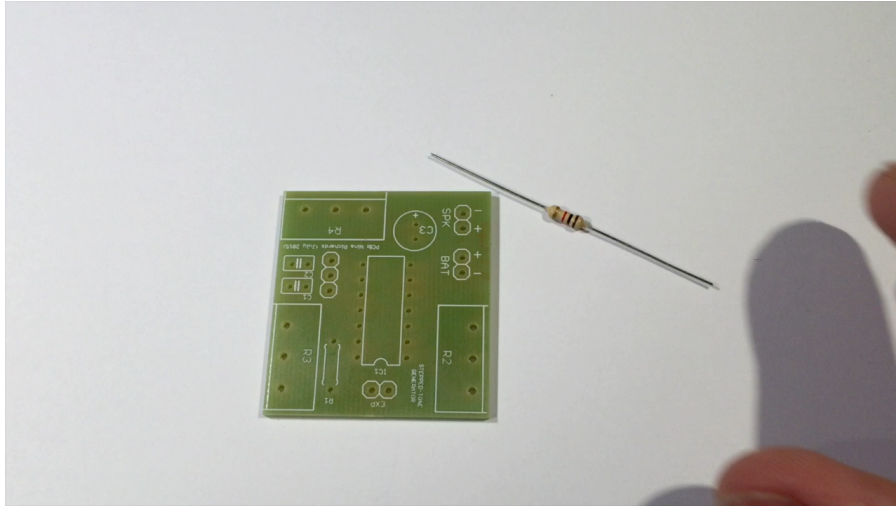


Yorkshire Sound Women Network

Check that you have all the parts:

- PCB (Printed Circuit Board)
- 2 x 470kOhm Potentiometers
- 1 x 4.7kOhm Potentiometer
- 1 x 1k Resistor
- 2 x 100nF Capacitors
- 1 x 10uF Capacitor
- 1 x NE555 Timer IC
- 2 x Speaker Wires
- 1 x 9V Battery Clip / Lead
- 1 x 8 Ohm Speaker

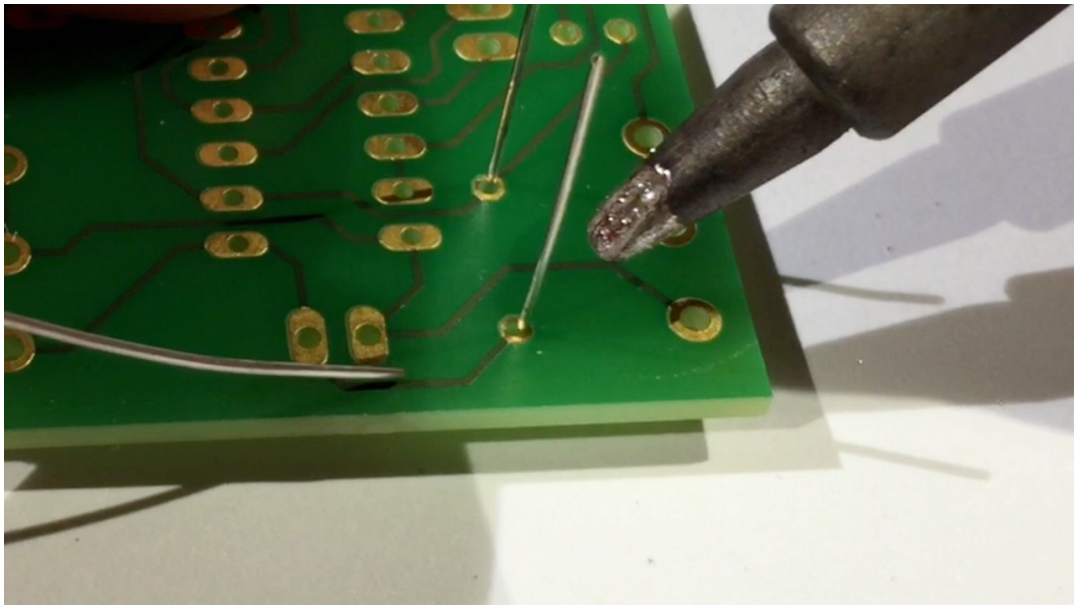




Step 1: Resistor (R1)

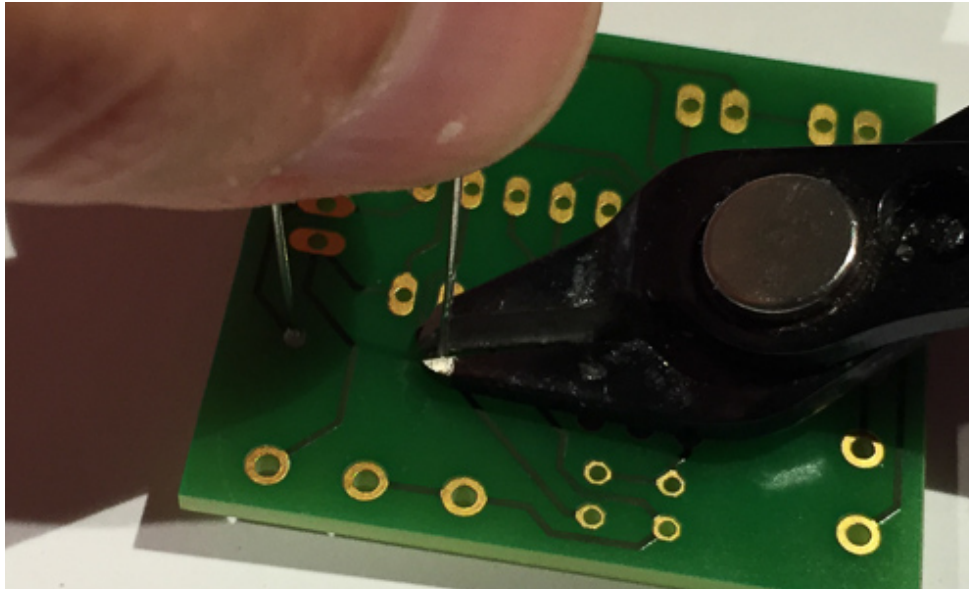
Bend the resistor legs ready, then insert into the PCB (labelled R1).
Resistors can go any way around as they don't have polarity.

Note that the side of the circuit board with the text and outlines is the top - we push the parts through from this side.



Soldering the Resistor

Place the soldering iron tip on the solder pad where it meets the component leg.
Apply a **small amount** of solder to the **solder pad** on the side opposite to the soldering iron.

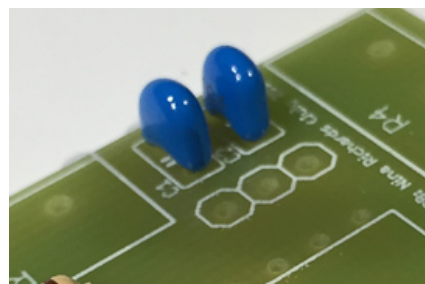
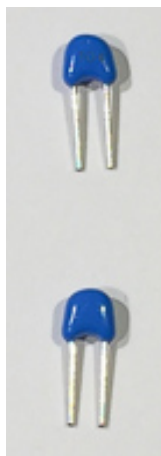


Trimming the Component Leads / Legs

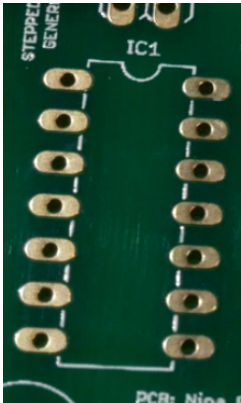
Use the side-cutters to trim away the excess leads / legs.
Try not to cut through the solder itself, as this might weaken the joint.

Step 2: Soldering the Two Ceramic Capacitors (C1 and C2)

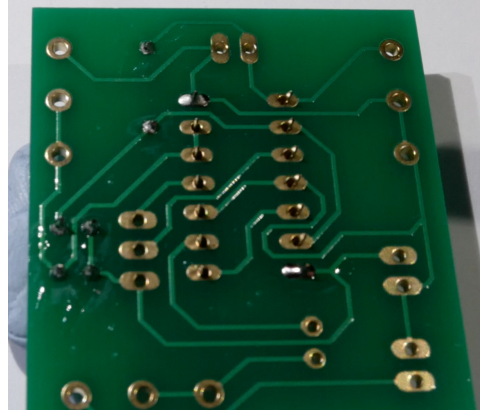
- The soldering process is the same for these two components as the resistor in the previous step.
- Your capacitors may be a different colour.
- Place them in C1 and C2.
- This type of capacitor isn't polarised and so can go any way around.
- Trim away the excess leads when done.



Match the notches!



Solder two opposite corners first!



STEP 3: Soldering the IC (Chip)

This must be inserted the correct way around - look for the notch or dot.
Solder two opposite corners first and check the chip is flush with the PCB,
then solder the other pins.

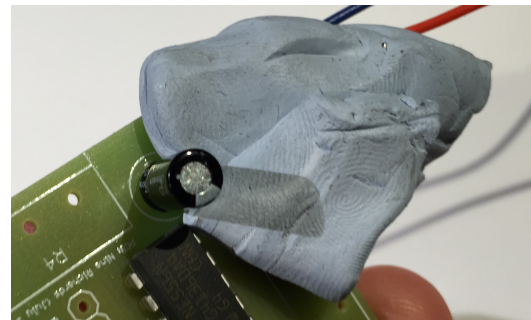
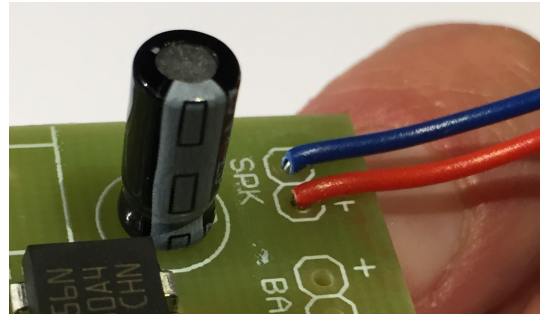
Step 4: Soldering the Electrolytic Capacitor (C3)

- **Careful!** This component is polarised and must be soldered the correct way around! The positive pad is marked on the PCB and the negative side of the capacitor is marked with minus signs.
- Once inserted - solder and trim off the leads.



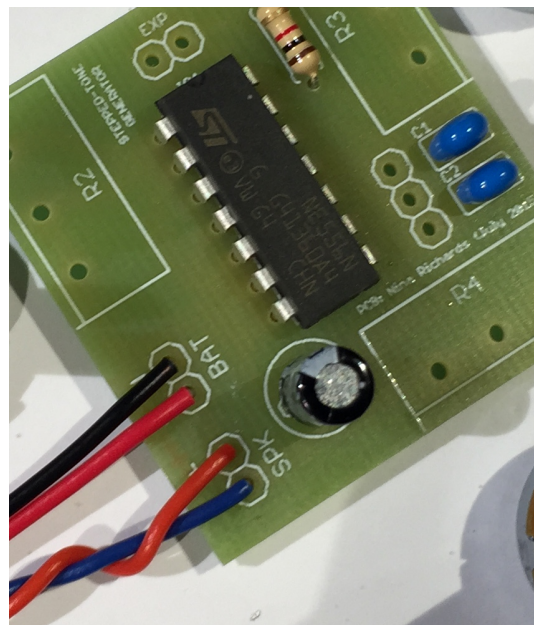
Step 5: Soldering the Speaker Wires

- Insert the red (+) and blue (-) wires into the PCB (SPK) and bend them to the side as pictured.
- Blu-tack can be used to hold the wires in place while soldering.
- Solder and trim off the excess wires.
- Ensure that the wires aren't touching, causing a short circuit.



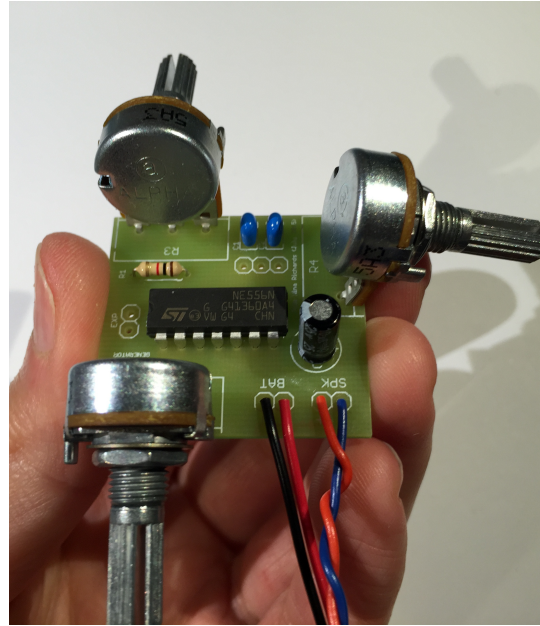
Step 6: Soldering the Battery Wires

- In the same way as the speaker wires, solder the battery leads in place.
- Match Red (+) and Black (-) as marked on the PCB.



Step 7: Soldering the Potentiometers

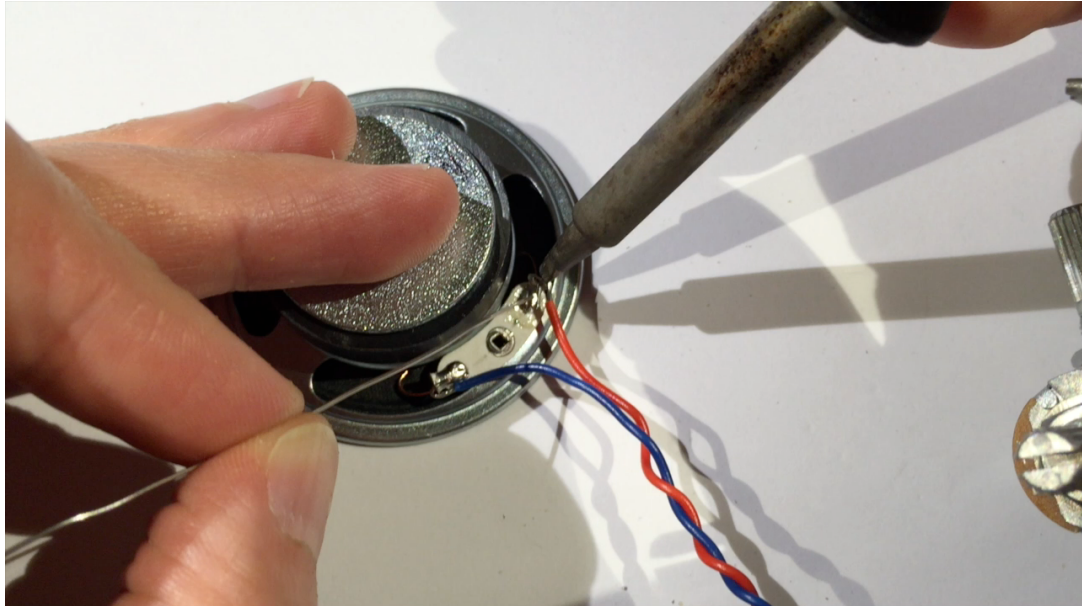
- Insert the three Potentiometers.
- Two are marked B470K - these go in R2 and R3.
- One is marked B4.7K - this goes in R4.
- Carefully turn over the PCB and solder all three components.



Step 8: Preparing the Speaker

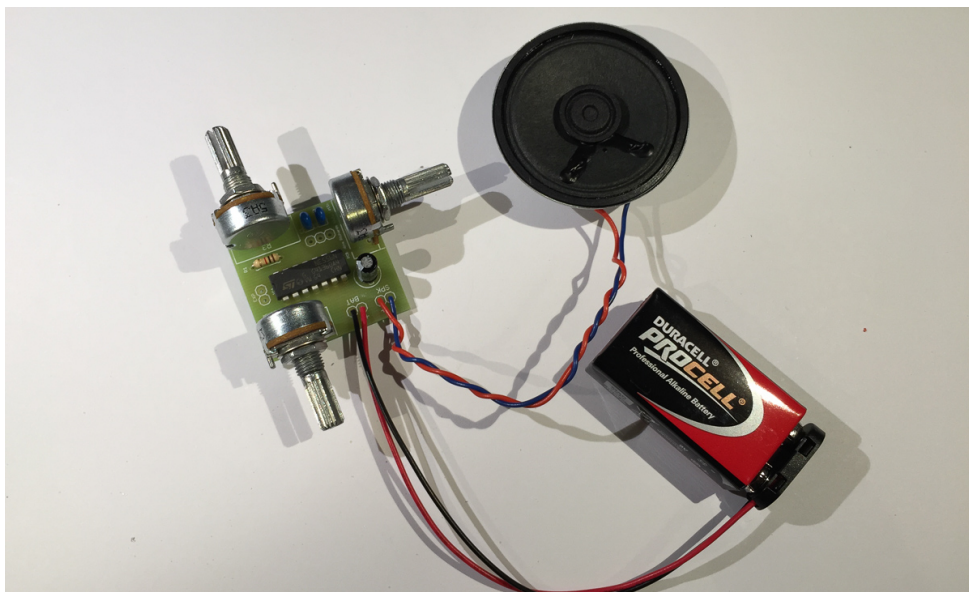
- + and - are marked next to the speaker's solder tags (small metal loops).
- Polarity: Red (+) and Blue (-).
- Carefully bend up the solder tags to give yourself a bit of room to work.
- Bend the end of the wires and hook them into the loops.





Step 9: Soldering the Speaker

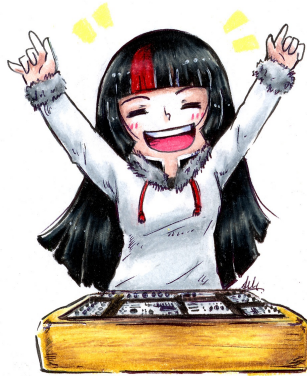
Solder each wire and check that the wires aren't touching the metal of the speaker frame. The magnet of the speaker might pull the soldering iron towards it while soldering - take care!



Connect the Battery and Experiment with the Potentiometers!

One of the potentiometers is the volume control, the other two change the sound.

Thank You!



Nina Richards @nr2097

<http://www.transistorsoundslabs.com/>

Yorkshire Sound Women Network @YSWN_

<https://yorkshiresoundwomen.com>

DIY Electronics and Kits

Adafruit (US)

<https://www.adafruit.com/>

SparkFun Electronics (US)

<https://www.sparkfun.com/>

Cool Components

<https://www.coolcomponents.co.uk/>

HobbyTronics

<http://www.hobbytronics.co.uk/>

Proto-Pic

<http://www.proto-pic.co.uk>

Arduino

Open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects.

<https://www.arduino.cc/>

Parts

Rapid Electronics

<https://www.rapidonline.com/>

Farnell (Element 14)

<http://uk.farnell.com/>

RS

<http://uk.rs-online.com/>

Mouser

<http://www.mouser.co.uk/>

Ebay

<http://www.ebay.co.uk/>

(Good source for one-off parts)