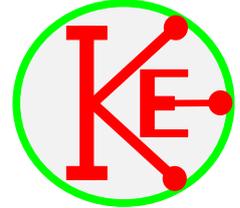
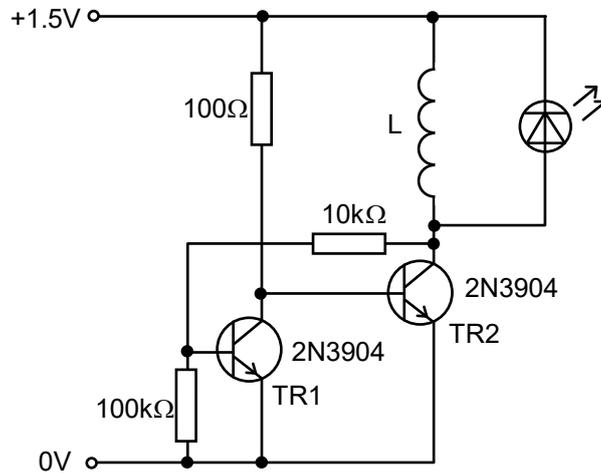


1.5V White LED circuit



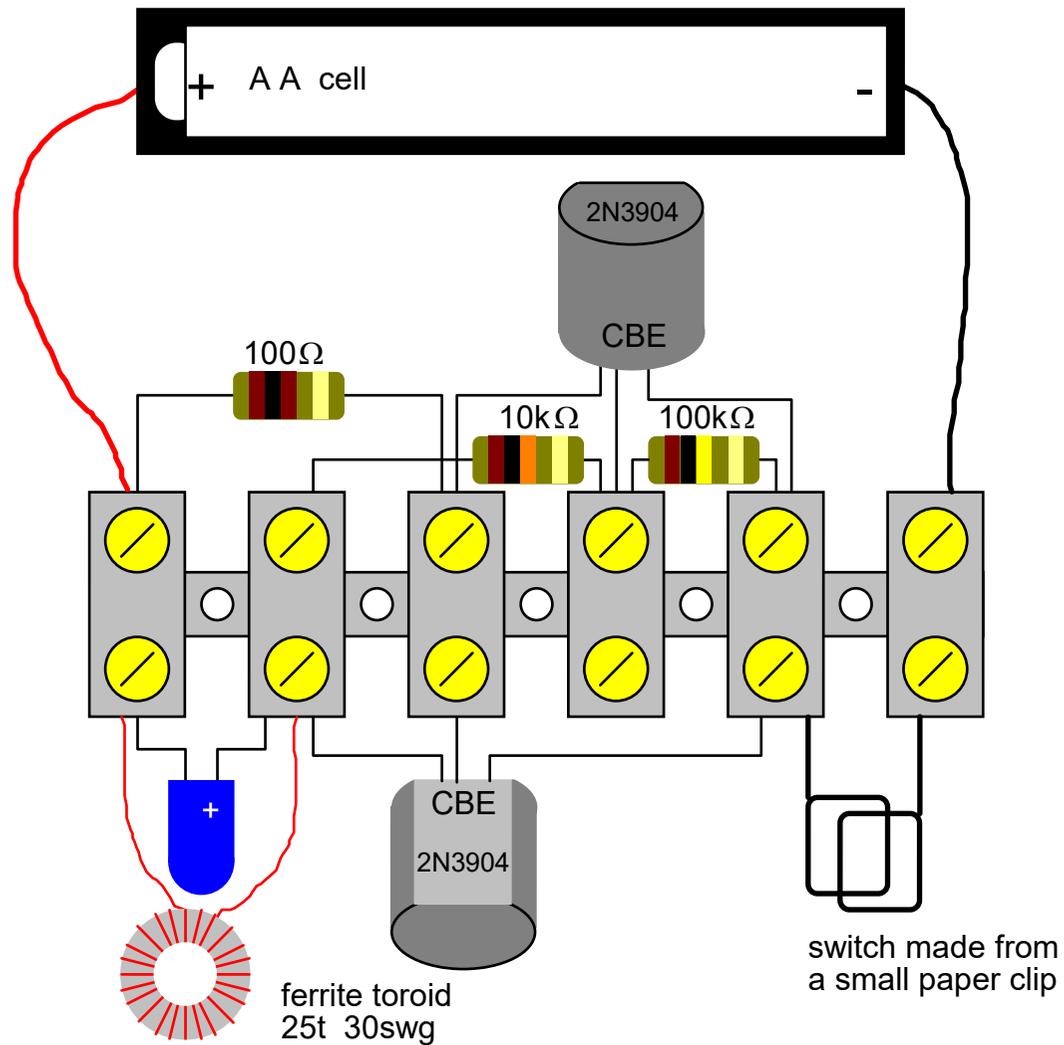
Specification

Powers any LED from a 1.5V supply.
Operates from ~0.8V to 1.6V.
Operating current approximately 20mA from 1.5V.



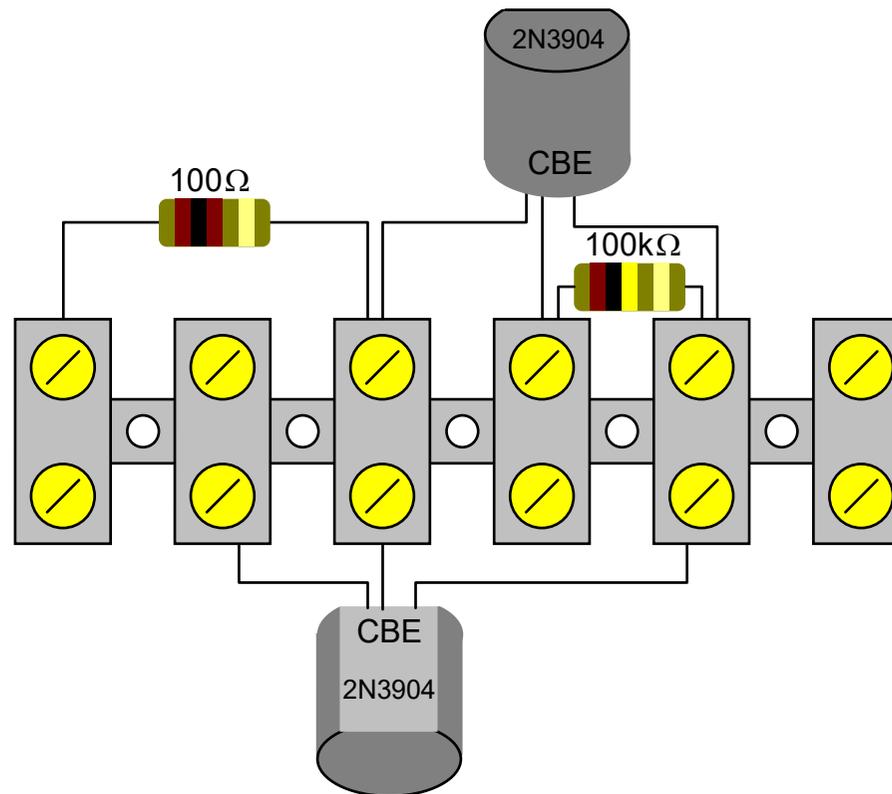
Inductor values are not critical, the prototype coil was 25 turns of 30swg wire wound on a 1cm diameter ferrite toroid liberated from a failed compact fluorescent lamp. ($L \approx 1\text{mH}$)
The resistance of the inductor should be small - 1-2 Ω .
The 10k Ω resistor may need adjusting to provide stable operation with some inductors.

Terminal Strip Layout



Step by step construction.

- 1). Take the 100Ω resistor (brown, black, brown and gold) and the $100k\Omega$ resistor (brown, black, orange and gold). Carefully bend the leads so that they will fit as in the diagram below. Trim the leads if necessary. It does not matter which way round they are connected. Take the two 2N3904 transistors and carefully bend the leads so that they fit into the terminal strip. Trim the leads if necessary. The transistors **MUST** be connected the correct way round.



- 2). Take the 10kΩ resistor (brown, black, orange and gold). Carefully bend the leads so that they will fit as in the diagram below. Trim the leads if necessary. It does not matter which way round it is connected.

Take the ferrite toroid and the 30swg enamel coated wire.

Thread about 30 cm of wire through the centre of the toroid and then start to coil the free end of the wire around the side and back through the centre of the toroid. Continue until there is only about 5cm of wire left.

Count how many turns you have made. Remembering that this number of turns was made with 30cm of wire, cut a length of wire from the reel sufficient to complete the remaining turns to give a total of approximately 25 turns plus 5cm at the end.

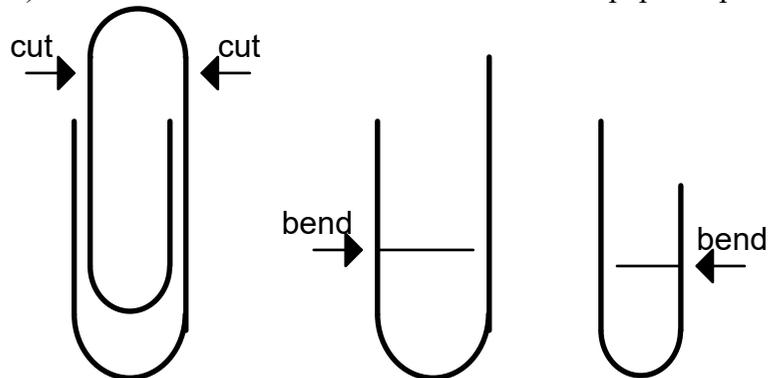
Remove the enamel from the ends of the wire using a piece of sand paper.

Take the LED and coil and carefully fit to the terminal strip.

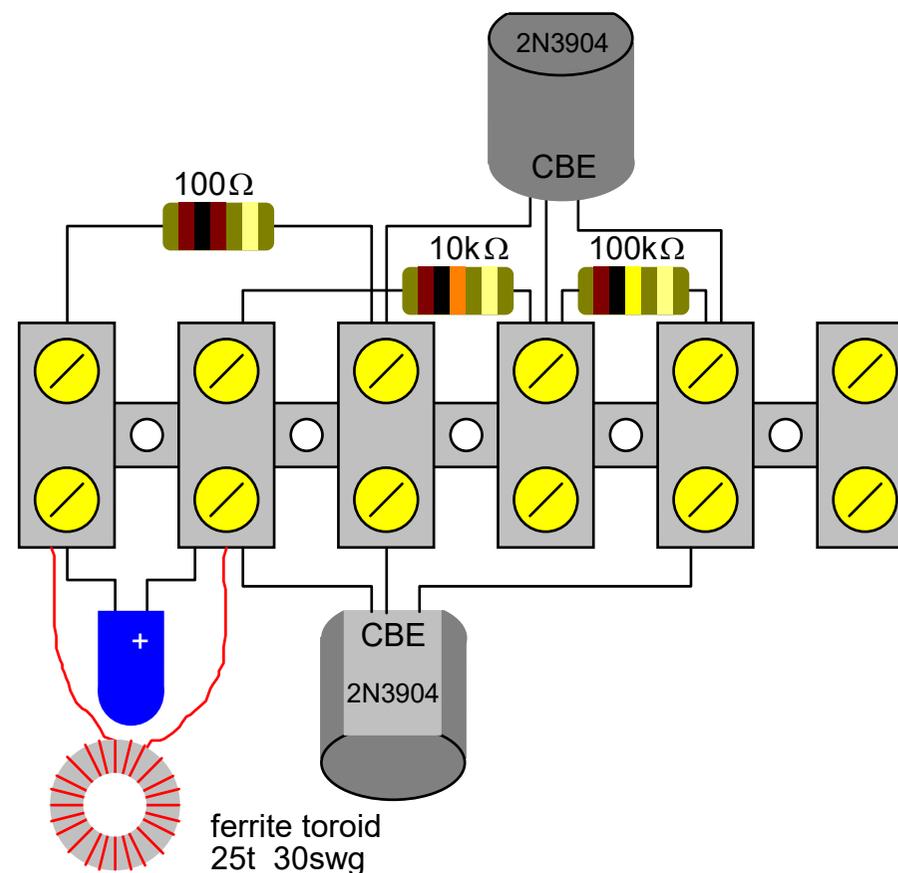
It does not matter which way round the coil is connected.

The LED MUST be connected so that the negative (flat) side of the LED is connected to the far left terminal.

- 3). The switch is made from a small metal paper clip.



After bending the paper clip wire, trim off any excess so as to produce neat loops.



- 4). Fix the paper clip pieces to the terminal strip, and gently bend so that they only make contact when squeezed together.
Take the battery holder and connect the wires to the terminal strip as in the diagram. Put the battery into the battery holder and squeeze the switch terminals together. If all is well, the LED will light. If it does not then check for wiring errors and make sure that the thin wire of the coil is making proper contact.

The terminal strip can be secured to the battery holder with sticky tack, forming a compact torch.

