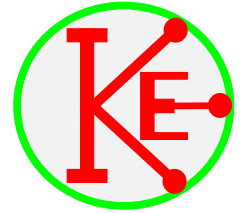


## 10 Continuity tester



### EQUIPMENT

- For each Continuity tester
  - 1 x 1k $\Omega$  resistor,
  - 1 x clear blue 5mm LED,
  - 1 x 6 section 3 Amp terminal strip,
  - 1 x PP3 battery connector,
  - 1 x PP3 battery,
  - 1 x red and black test wire.
- Blu-tac
- small screw drivers
- Wire cutters

### NOTE

Clear blue 5mm LEDs were found to still light with a current of 200 $\mu$ A, so making the circuit useful for identifying good and poor conductors.

The PP3 batteries only need to be cheap zinc carbon types and can be left permanently connected as no current flows if the test wires are not joined.

### RISKS

Stab injuries from wires and screw driver.

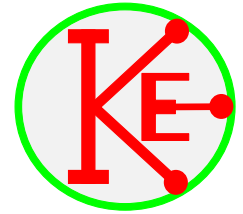
Cuts from wire cutters.

Warn against connecting the LED directly across the battery as it will damage the LED and they can explode!

**WARN ABOUT USING THE CONTINUITY TESTER ON ANYTHING CONNECTED TO A BATTERY OR THE MAINS ELECTRICITY.**

### SESSION

- 1). Identify and discuss the components, especially the flat on the LED side.
- 2). Show how to avoid stab injuries with the screw drivers - terminal strip on desk.
- 3). Whole group construct circuits step by step.
- 4). Students test samples for conductivity while remaining circuits made to work.



## 10 Continuity tester

A Continuity tester determines whether a material is:  
 a good conductor of electricity  
 a poor conductor of electricity  
 an insulator (does not conduct electricity).

It works by trying to pass a small electric current through the material.

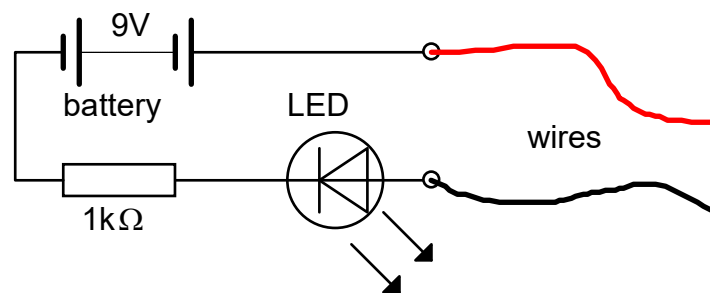
A good conductor lights the LED brightly, a poor conductor lights the LED dimly.

The LED does not light if the material is an insulator.

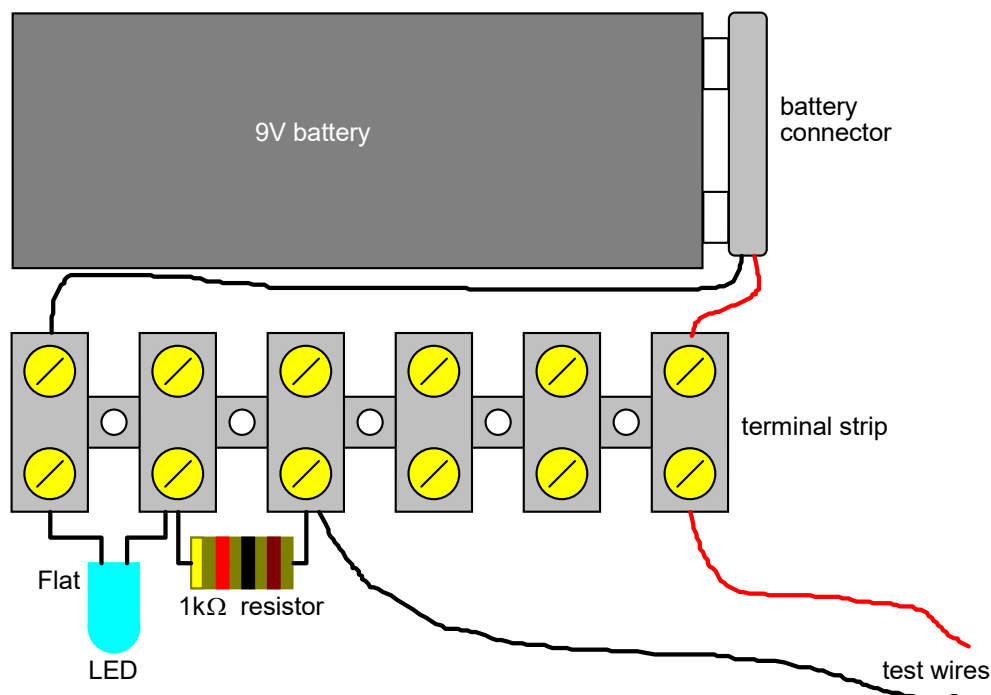
It can be used to test wires, cables, headphones, fuses as well as electronic components like LEDs, diodes, capacitors, transistors etc. It can also be used to check for damp and when potted plants need watering.

**NEVER USE ON ANYTHING CONNECTED TO A BATTERY OR THE MAINS ELECTRICITY.**

### Circuit diagram

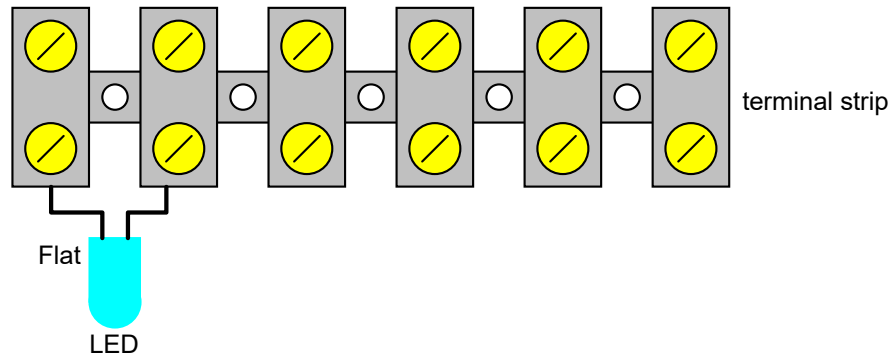


### Terminal strip layout

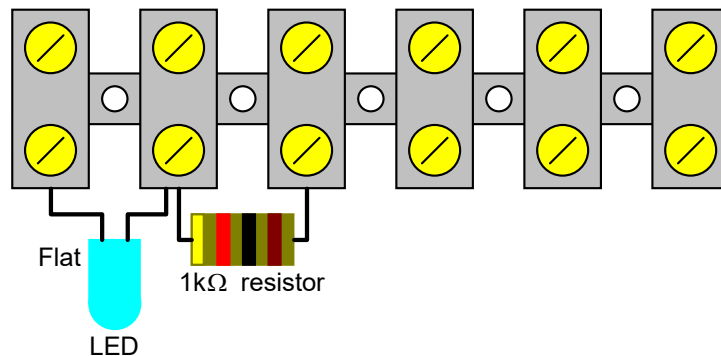


## Step by step construction

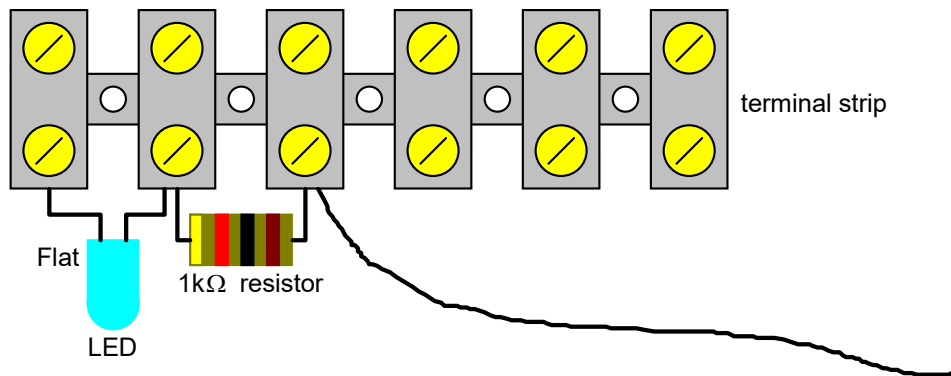
- 1). Take the LED and find the side which is flat.  
Carefully bend the leads so that it will fit into the terminal strip.  
You may need to loosen the screws first.  
Make sure that the flat is at the end of the terminal strip.  
Carefully tighten the screw at the end.



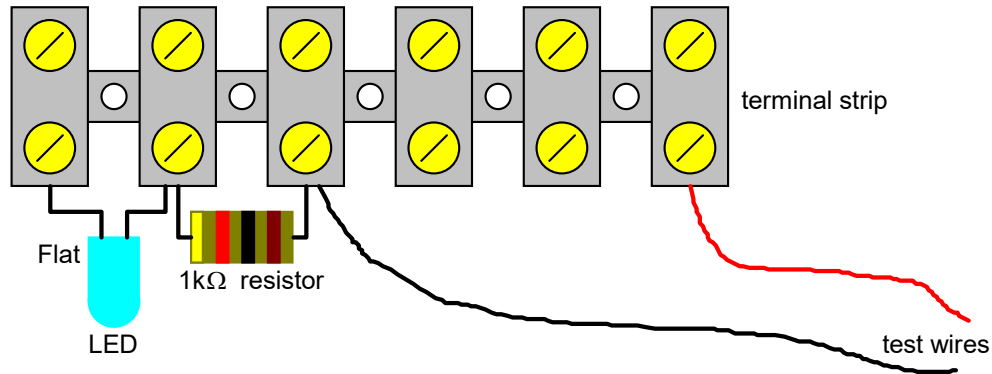
- 2). Take the 1k $\Omega$  resistor (brown, black, red gold).  
Carefully bend the leads so that it will fit into the terminal strip as below  
Carefully tighten the second screw.



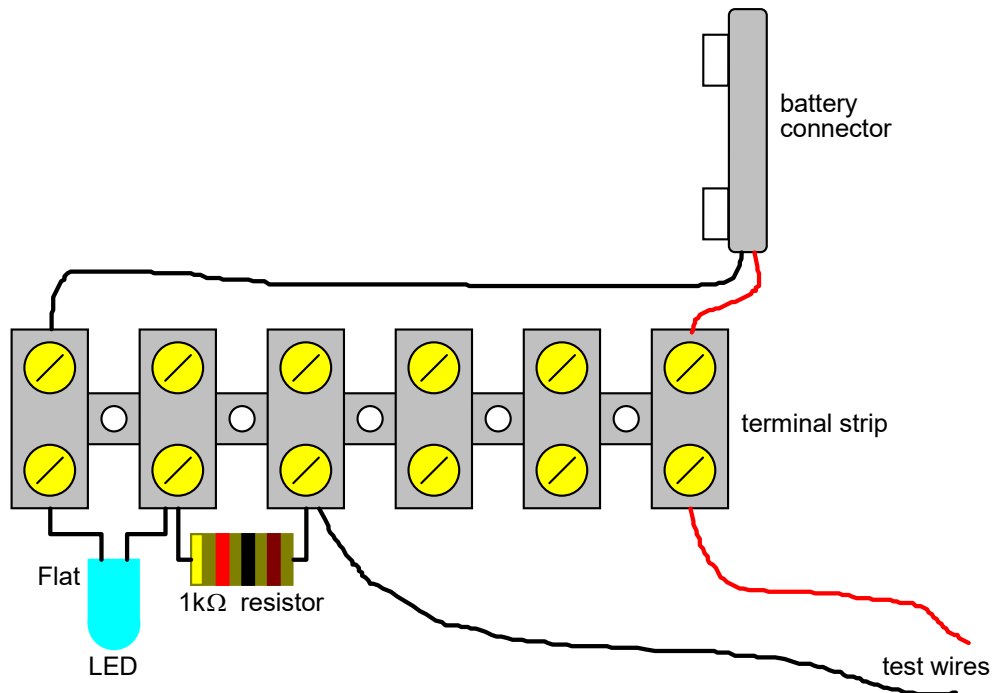
- 3). Take the black test wire and fit it to the terminal strip as below.  
Carefully tighten the third screw.



- 4). Take the red test wire and fit it to the terminal strip as below.  
Carefully tighten the screw.



- 5). Take the battery connector and fit the black and red wires to the terminal strip as below.  
Carefully tighten the screws.



- 6). Connect the battery to the battery connector.  
Touch the test wires together.  
If the LED does not light, check for wiring faults or screws not tightened.  
If the LED does light, fix the terminal strip to the battery with Blu-tac.  
WELL DONE - your continuity tester is finished.

**NAME:** .....

**Using the Continuity tester.**

Touch the test wires onto the object being tested.

If the LED lights brightly, it is a good conductor.

If the LED lights dimly, it is a poor conductor.

If the LED does not light, it is an insulator.

Test the following materials and tick the box which best describes the material.

Then find some other materials to test. Enter their names into the table below and record your results.

Material	Good conductor	Poor conductor	Insulator
Paper			
Wood			
Plastic			
Copper			
Iron nail			
Cardboard			
Tin can			
Rubber			
Pencil lead			
Glass			
Aluminium			
Potato			
Stone			