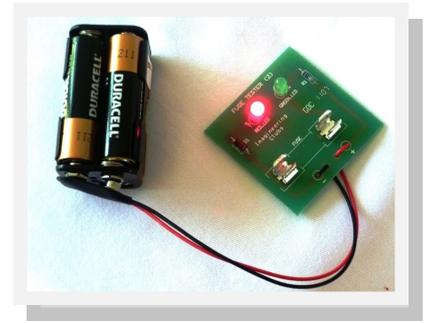


FUSE TESTER Mk II

TEACHER/TUTOR NOTES & WORKSHEETS



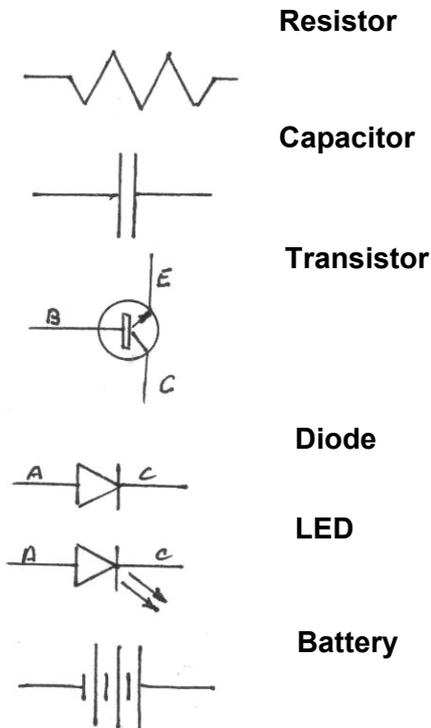
The project will take probably two sessions.

This project introduces some of the fundamental concepts of electricity –

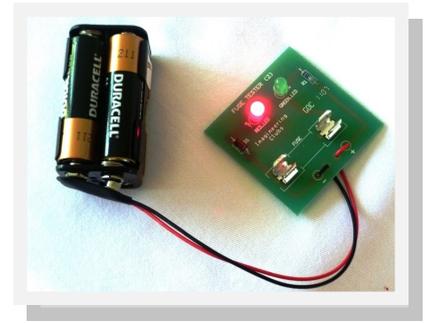
- Electrical current, voltage and resistance
- Electrical circuits
- The function of diodes

It also introduces the practical use of printed circuit boards and the soldering of components to them.

The electrical circuit for the project is given in the Instructions where the components are shown by symbols. The commonly used symbols are given in the diagram. In this project transistors are not used however.



FUSE TESTER Mk II



- The current in a circuit equals the voltage divided by the resistance. This means the higher the voltage the higher the current and the higher the resistance the lower the current. The resistor chart enables the value of a resistance to be read from the colours printed on it. The resistor in this circuit limits the current which would flow through the diodes.
 - A diode is like a resistor but only works when the current flows in one direction. It has a low resistance in one direction but a very high resistance in the opposite direction.
 - A “Light emitting diode” or LED is a diode which lights up like a bulb when it is passing electricity.
- This project shows in a parallel circuit how a larger current will flow in the path of least resistance.
- If the fuse is good and will pass a current and the green LED will light up. A small current will pass through the red LED and diode but not sufficient to light it up.
 - When a dud fuse is used then all the current flows though the red LED and nothing through the green.

Session 1:

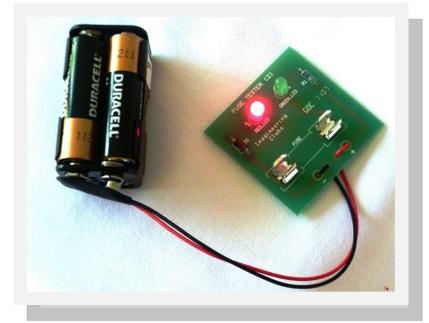
Blackboard

- Electrical Circuits
- Component symbols
- Printed Circuit Boards
- Advantages over wired circuits.
- This has the pattern of all the wires attached to the back of the board. It is made by etching away the conducting metal which is not wanted.
- **PCBs** have the advantage that it is easy to solder the components in their correct positions and it makes a much neater arrangement than pins and Formica board.
- A **diode** allows current to flow in one direction only. It must be assembled in the correct way round with the silver band in the position shown in the instructions.
- An **LED** is a diode or valve which only lets electricity pass in one direction and lights up when it does. It must be assembled the correct way round with the shorter leg (the leg by the flattened edge of the rim) in the hole shown on the circuit diagram.

Practical

- Further practice soldering wires to a scrap PCB or Matrix board.
- Examine PCB and decide where resistor goes
- Identify correct resistor with “Resistor Chart”
- Assemble and solder resistor in position.
- Cut off the excess Resistor wires.

FUSE TESTER Mk II



Session 2:

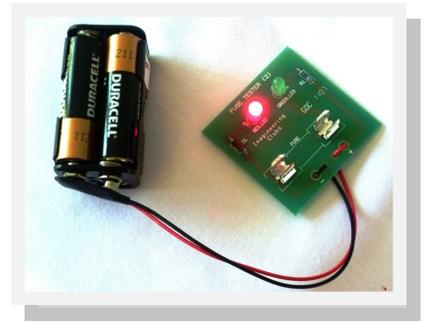
Blackboard

Revision of Session 1

Practical

- Complete assembly and soldering.
- Test with a 6 volt battery or power source.
- Confirm that the green LED lights if a good fuse or a piece of metal joins the two fuse terminals. The red LED should light if there is no connection between the terminals.
- Competition to see who can invent a way of using the fuse tester as a burglar alarm.

FUSE TESTER Mk II



WORKSHEET

1. Why do you use a fuse in an electrical circuit ?

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2. Draw the sign for the fuse used on the circuit diagram

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3. What electronic components give out light when a current is passed through them ?

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4. Give an example of an electrical sign which is green for go and red for stop. Are any other colours used?

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5. Write a story about someone who did not check the fuse when the electric fire went out.

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