

Schematic Diagrams

A schematic diagram is a concise, symbolic description of an electrical circuit. It specifies the elements that make up an electrical circuit and how they are connected. Schematic diagrams form one of the basic languages of electrical engineering.

On a schematic, there may be many parts which are identical in type or part number. To distinguish them, components have a *reference designator* or *instance name* which specifies each individual component. A component will also have either a part number, or value associated with it also. Some components such as transistors have no single value that can specify them, while a resistor needs only a value if its wattage rating is understood. There are no rules other than common sense that dictate what should or should not be on a schematic.

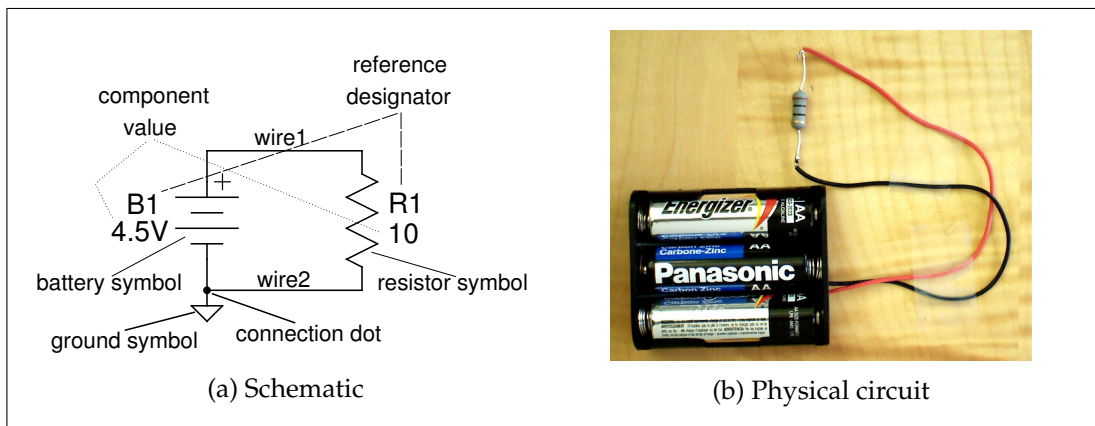


Figure 1: Correspondance Between Schematic Diagram and Physical Circuit

A document that accompanies the schematic which fully specifies the parts in a design is known as the *bill of materials* or BOM. The BOM contains the listing of all parts in a design. The linkage between the schematic and the BOM is via the reference designator. If the parts are on a printed circuit board, the reference designator is silk screened on the board to aid in tracing the schematic and identifying the part on the parts list. The silk screen is usually shows up as reference designators and component outlines on the top side of the printed circuit board.

The Ground Symbol

Since voltage is measured between two points, to simplify matters one of the points in most circuits is called the *common*, *ground*, or the *reference point*. The term common typically refers to the node from which all voltage measurements are made from. By convention, the voltage at the common node is considered to be zero.