Electronic Fabrication

Rodney Dorville

Overview

- Quick introduction to Electricity & Electronics
- Physical & logical views
- Reading Schematic Diagrams
- Prototyping techniques
  - Breadboarding
  - Stripboarding
- Electronics Production
  - Schematic capture
  - Board layout
  - Soldering

Part A: Basic Electronics

Electricity, Electronics, Physical components, Symbols

Electricity

- Electricity is a type of energy
  - Static electricity – gathers is one place
    E.g. Rubbing a balloon with a woollen cloth
    Balloon retains a charge
  - Current electricity – flows from one place to another
    E.g. Battery powering up a light bulb
    Current flows from the positive end of the battery, through the bulb, lighting it up and back to the negative end of the battery.
- Circuit boards are connections between devices and flow paths for electricity.

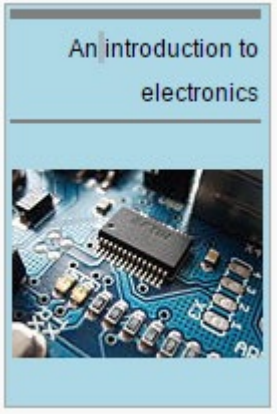
Read: Explain that stuff - Electricity

Electronic components

- Devices that use electricity are called electrical/electronic components.
- They are usually
  - Wires – connects the components
  - Switches – opens/closes the circuits
  - Resistors – provides resistance to the flow
  - Capacitors – stores charge / blocks DC or allows AC
  - Inductors – coils that resists change in current
  - Diodes – allows or blocks current
  - Transistors – amplifies signals
  - Integrated Circuits – miniaturized combination of the above items

Common formulas

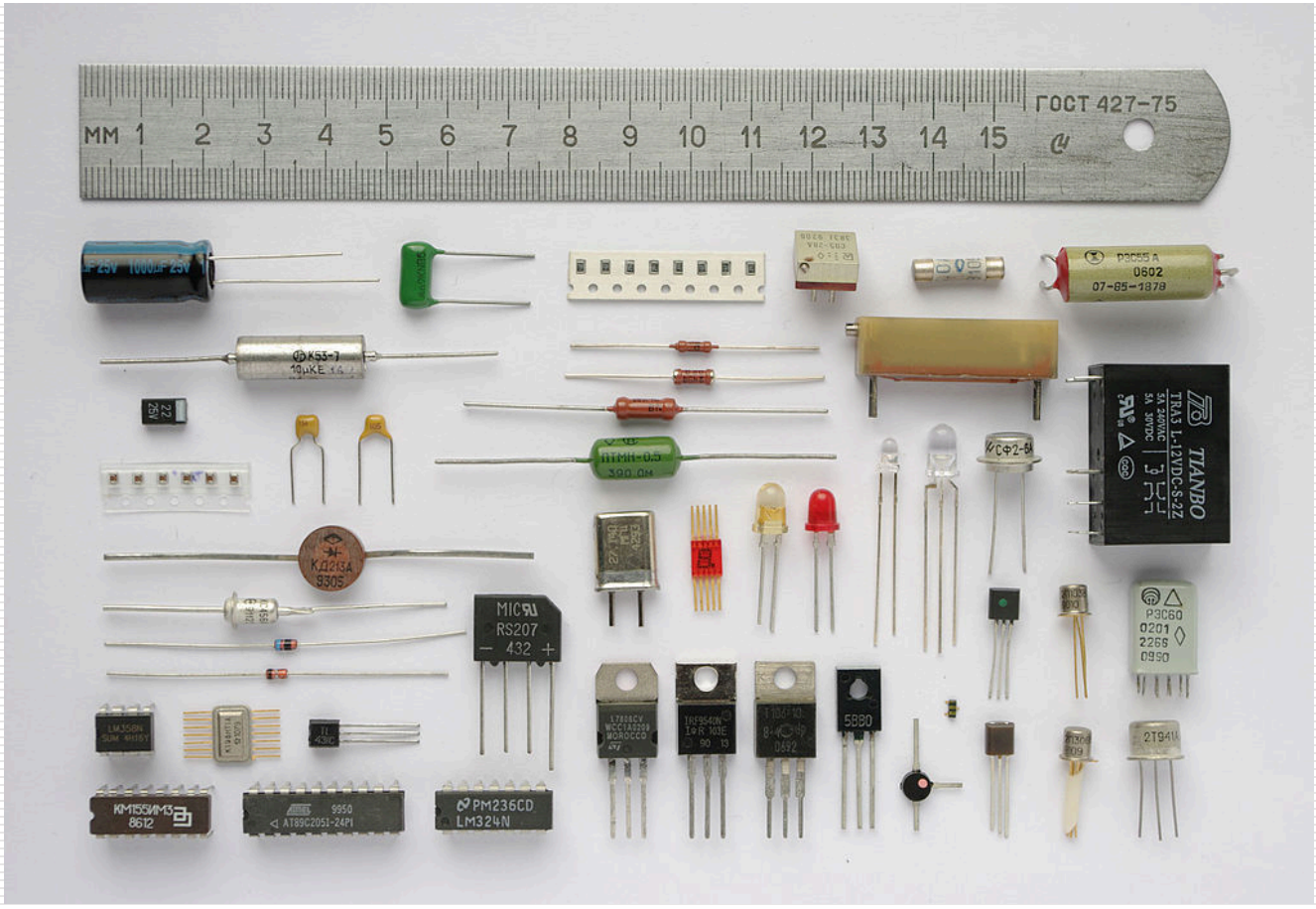
- Ohms Law
  - Voltage = Current * Resistance (V= IR)
- Power
  - Power = Voltage * Current
- Other laws
  - Kirchoff voltage & current
  - Norton's theorem
  - Thevenin's theorem
- Required only if you are designing circuits
  Basic knowledge required for testing



Ref: [Wikipedia Book – An Introduction to Electronics]

Electronic Components

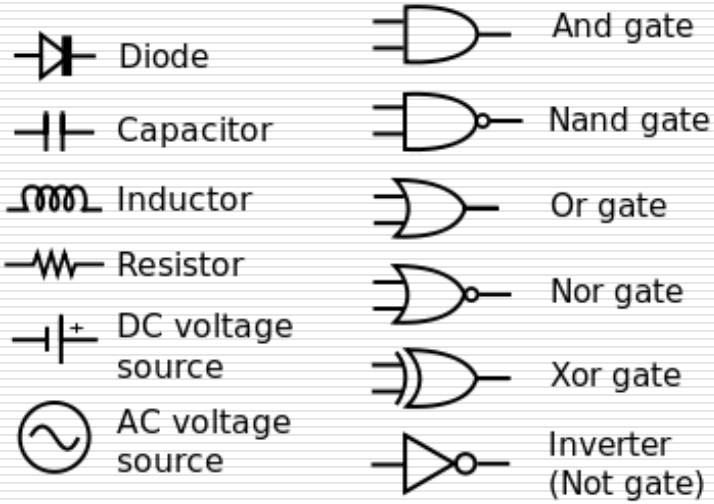
- Physical Identification



Read: [Wikipedia – Electronic Component]

Electronic Symbols

- Electronic Symbol



- Used to represent electronic circuits
- Can be translated manually or electronically into a physical circuit.
- Standards apply.

Read: Electronic Symbol

Simple Guide to Electronic Components

- YouTube: A simple guide to electronic components

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