

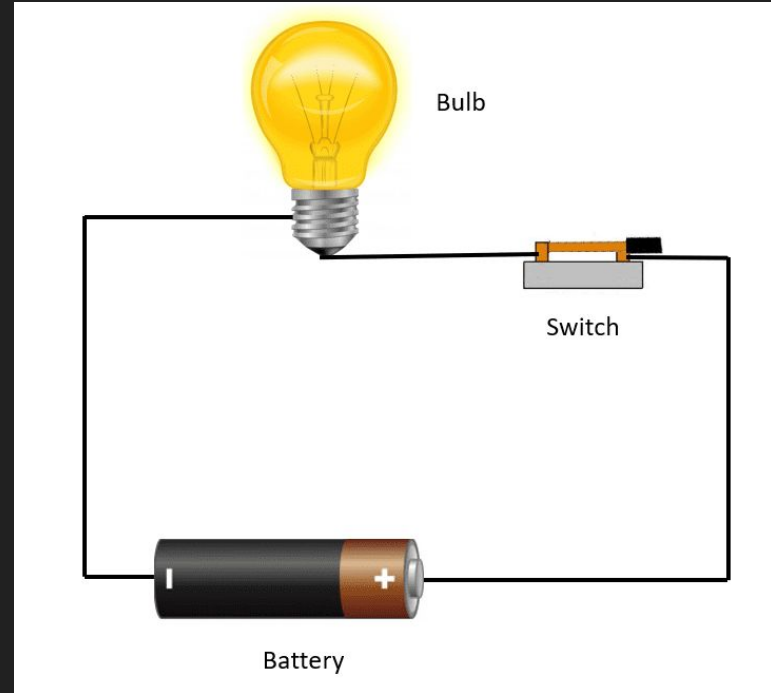


# Circuit Boards

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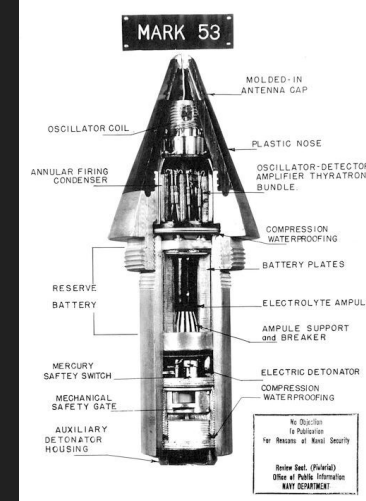
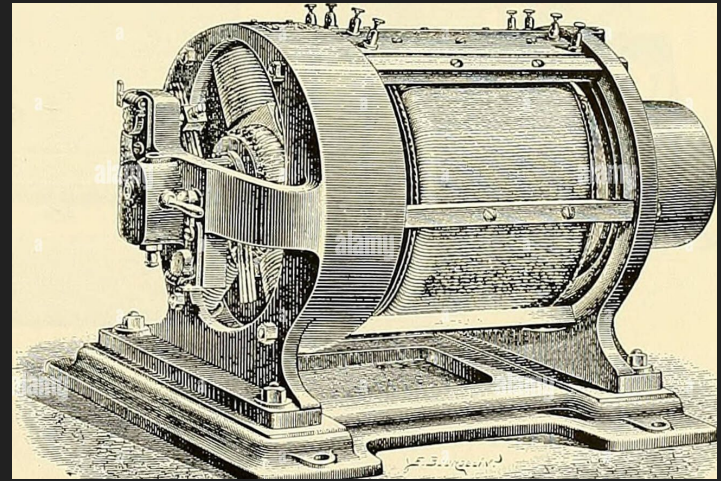
# How Do Circuits Work?

- Circuits are an important part of electronic devices.
- They operate mainly by receiving an electric current that circulates throughout the circuit and powers the different components attached to it.
- It works very similar to the human circulatory system.
- Modern-day circuits are printed and engraved material known as PCBs (printed circuit boards).



# History

- Before the 20th century, circuits were not printed and were instead wired together. They were bulky and fragile.
- Early prototypes of printed circuits were created in the early 20th century, but they were developed more during WWII.
- In 1948, printed circuit boards became commercially available, and became commonplace by the 1950s.
- Over time, as PCBs became more advanced, they became smaller and more powerful



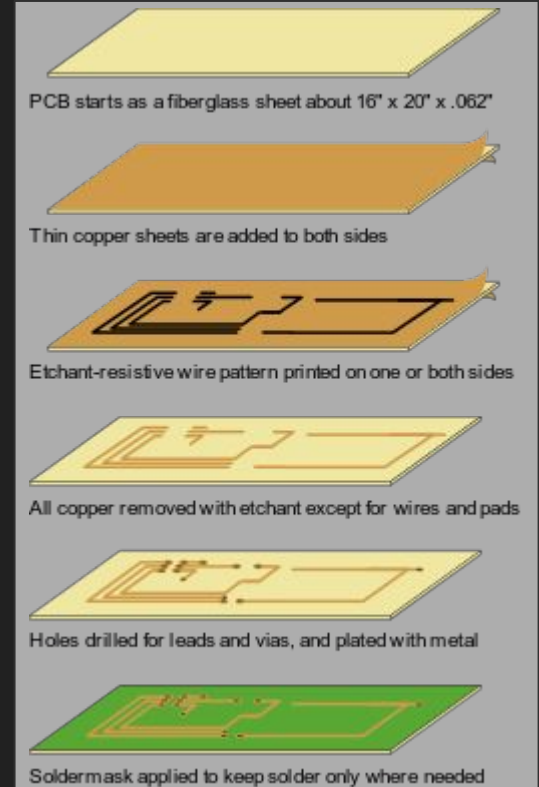
# What are PCBs Made of?

**Substrate** - Usually made of fiberglass, to act as the base where the copper will be laid on

**Copper** - Thin copper sheets are laid on both sides of the substrate. It acts as an inexpensive electrical conductor. This layer is then chemically etched to create the circuit patterns.

**Solder mask** - A layer usually made of polymer that protects the copper from oxidation and helps prevent solder points being mistakenly connected.

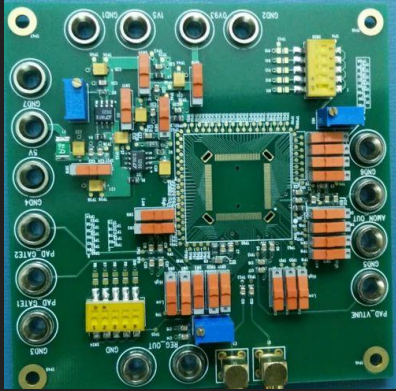
After the board is made, the rest of the components are attached.





# Types of Circuits

# Analog Circuits



Uses physical components such as resistors, diodes, capacitors, etc. Gets signals from varying voltage or current.

# Digital Circuits



Communicates with binary (0s and 1s). Are mainly constructed with logic gates such as AND, OR, XOR, etc.

# Hybrid Circuits



A combination of both digital and analog circuits.

# Uses

- Analog circuits can be used in devices such as audio amplifiers and radios.
- Digital circuits can be used in devices such as calculators or phones.
- Hybrid circuits mainly because most modern electronic circuits utilize both analog and digital, hence the need of hybrid circuits.
- If something uses electricity in any way, it most probably has some form of electrical circuit in it.

