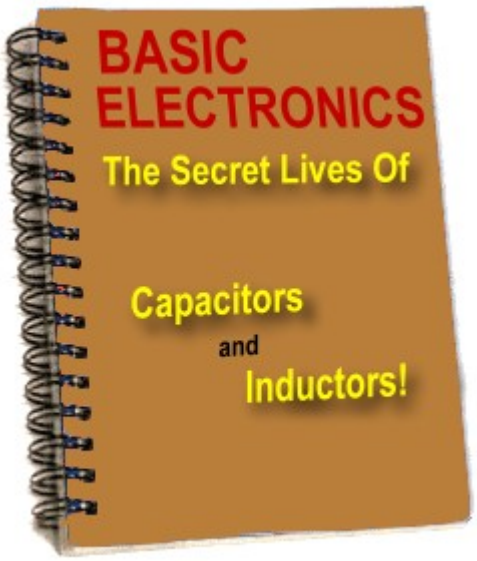

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Basic Facts On Capacitors And Inductors

I can't go into too great of detail here about the electric properties of capacitors and inductors since it involves alternating current theory and that is too big a topic for this small web page. If you're interested in learning more about capacitors & inductors check out my Introduction To Basic Electronics Home Study Mini Course

Here on this page I'll show you the schematic symbols for both and some basic things about their behavior.

A capacitor is made up of two metal surfaces that face each other but are insulated from one another.

The basic symbol looks like this ⊣⊢

If you put you put a source of voltage like a battery across the capacitor what would happen? Well, since the two plates are insulated from each other nothing would happen.

Actually, if you measured current flow in the circuit you would find a small amount of current would flow for just a brief moment.

This is because a capacitor can hold a electric charge. It is stored as an electric field between the two plates and the current flow was the capacitor charging up.

The amount of energy it can hold depends on it's value. Capacitors are measured in Farads or more commonly in micro farads and pico farads. The name comes from Michael Faraday (1791-1867), a very interesting man. Read some about him when you get the chance.

Coils and Inductance

Now for the coil or inductor. An inductor is a length of wire wound into a coil. Sometimes on an iron form or without depending on the amount of "inductance" desired. The more turns of wire on the coil the higher the inductance.

The symbol for an inductor with an air core is  . With an iron core

Inductance is measured in henrys and again more often in micro or pico henrys. Now what will happen if we put an inductor in place of the resistor in our famous circuit? Watch closely it behaves the opposite of the capacitor.

For a very brief moment nothing will happen then current will begin to flow and the only thing limiting the current will be the internal resistance of the coil. The inductor stores energy in a magnetic field. Remember the capacitor stores energy in an electric field. The combination of the capacitor and the inductor make magical things happen.

We need one more thing to tie this all together and that's magnetic fields. When current flows through an inductor a magnetic is formed around the inductor. When the current stops the field collapses back. Also, if you take a magnet and pass it around a coil a current will be induced in that coil or inductor.

So a changing current creates a magnetic field and changing magnetic field creates a current. Now, if you take two coils and arrange them so that the magnetic field of one "cuts" through the windings of the other you have a transformer. Transformers can have either an air core or iron core.

The symbol looks like this  if it's air core and this  if it's iron core.

Iron cores are "usually" used at low frequencies up through the audio range where higher inductance is needed and air cores are used at radio frequency. The exception is with special powdered iron compounds which are used at high rf frequencies.

When you hook a capacitor and an inductor together *'magic'* things happen in that circuit. Almost every electronic device you use depends on that 'magic' combination of magnetic and electric fields.

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