

ELECTRONIC COMPONENTS EXPLAINED



In the easiest way



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Hey there! Welcome to Pluntx

At *pluntx*, we aim to make things easy for beginners and accessible for anyone curious about electronics. This e-book is a simple guide created to help you understand the most essential electronic components without feeling overwhelmed. Whether you're a student, hobbyist, or just getting started, we've broken things down in a way that feels clear, visual, and practical. No complex defs, no confusion, just the basics you actually need to know to start exploring, building, and creating. Let this be your first confident step into the world of electronics.

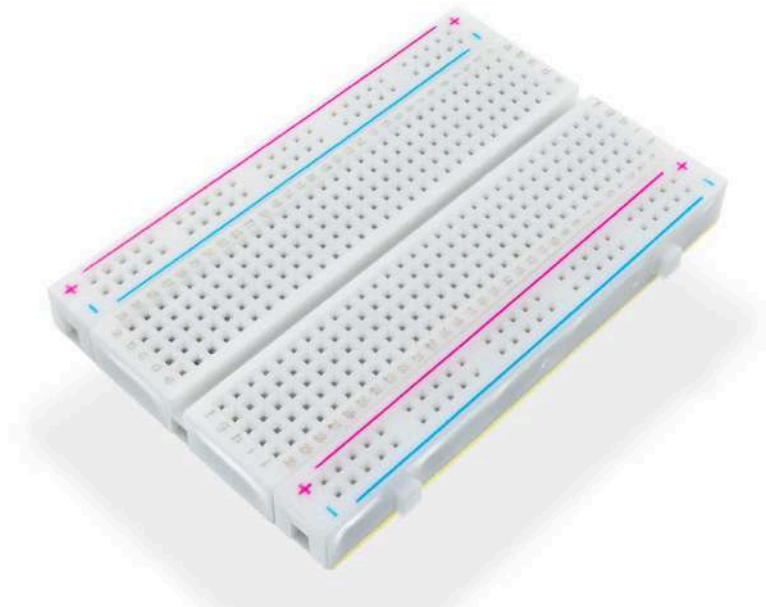
Meanwhile feel free to join our community of like-minded people and electronic enthusiasts! <https://chat.whatsapp.com/LR3t8bLkUatJOh2Ph0E6bw>

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Breadboard



A breadboard is a solderless prototyping platform used to construct and test electronic circuits. It consists of a perforated plastic block with internal metal strips that connect inserted component leads in a predefined pattern, allowing for temporary circuit configurations without permanent connections.

Sounds scary right, haha no problem, *A breadboard is like a LEGO board for electronics. You can plug in small parts and wires to build something, and if you make a mistake, you can just pull them out and try again—no glue or tools needed.*

So, Why It's Used: It is used for building and testing circuits quickly without soldering. It helps experiment, learn, and debug before making a permanent version of a circuit.

Where It's Used:

1. In schools and colleges for electronics labs
2. By hobbyists and makers for DIY electronics
3. In engineering and Research & Development labs for testing new ideas

4. During prototyping of new electronics before final product design

How It's Used:

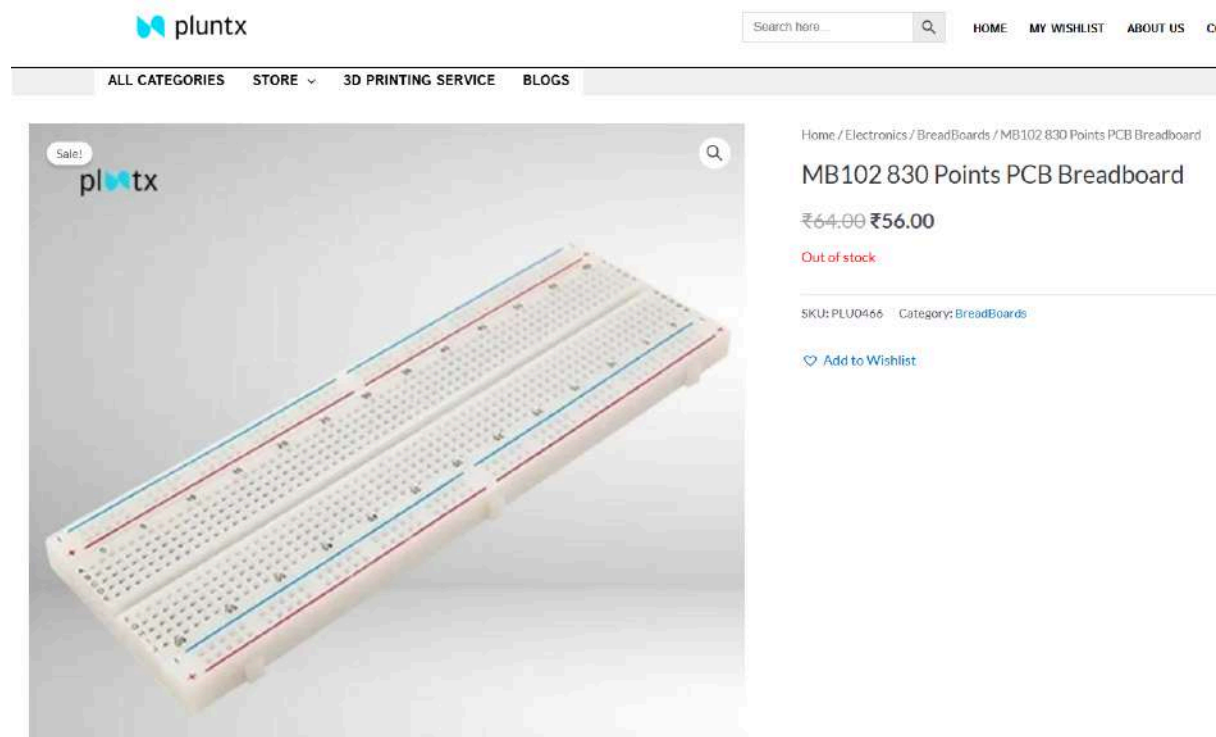
1. Components (like resistors, LEDs, sensors) are pushed into the holes
2. Wires connect different parts by using the breadboard's internal metal strips
3. A power source (battery or adapter) is connected to power rails
4. The layout can be changed anytime by simply unplugging and re-plugging components



Breadboard with components

What Happens If It Is Not Used:

1. You'd have to solder everything, which is time-consuming and not reusable
2. Trial and error become risky—mistakes can damage components
3. Learning slows down since every mistake is harder to fix

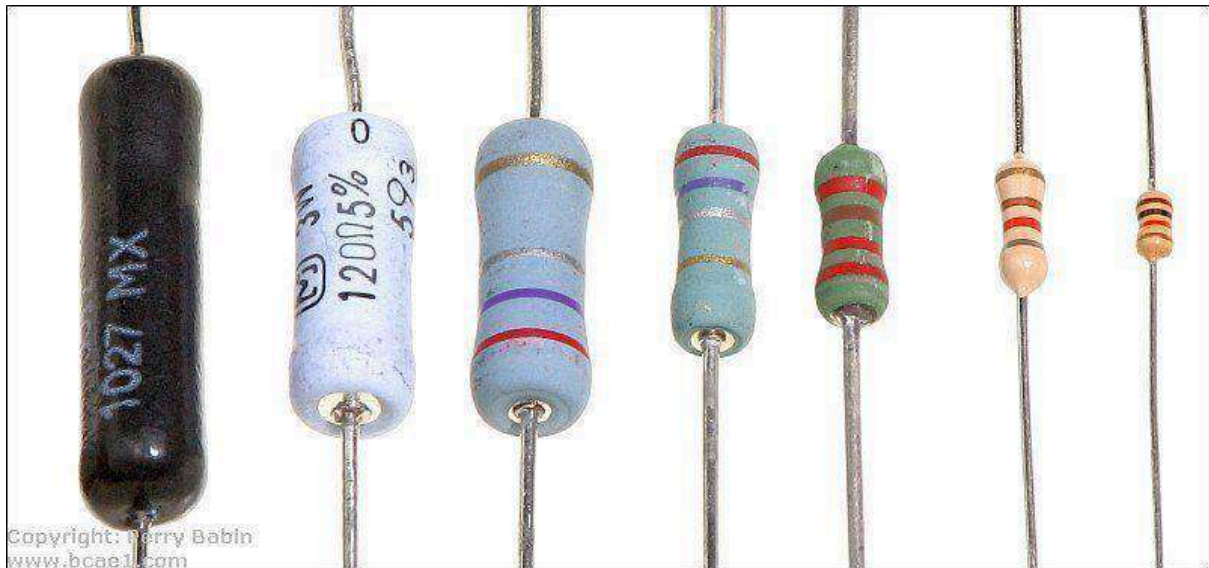


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Advantages:

1. No soldering required
2. Reusable and beginner-friendly
3. Safe for experiments
4. Helps visualize how circuits are built
5. Saves time in testing and learning

Resistor



A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. It restricts the flow of electric current and reduces voltage levels within circuits based on Ohm's Law ($V = IR$)

In simple terms, a resistor is like a traffic speed bump for electricity. It slows down the current so things don't get too hot or break.

Why It's Used: To limit current, reduce voltage, protect components, and control signal levels in a circuit.

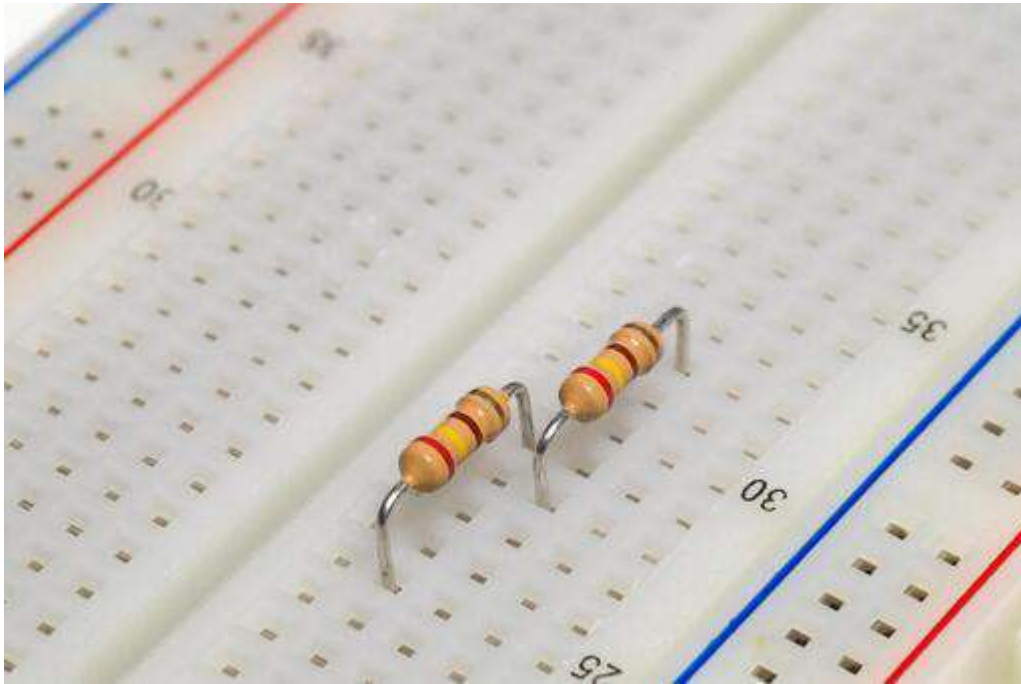
Where It's Used:

1. In almost every electronic device
2. Inside TVs, phones, computers, chargers
3. In sensors, lights, speakers, and more

How It's Used:

1. Plugged into a breadboard or soldered on a circuit board
2. Placed in series or parallel to manage current flow

- Often used in combination with LEDs and transistors



What Happens If Not Used:

- Components can receive too much current and burn out
- Circuits may behave unpredictably or stop working
- LEDs can blow up if not protected

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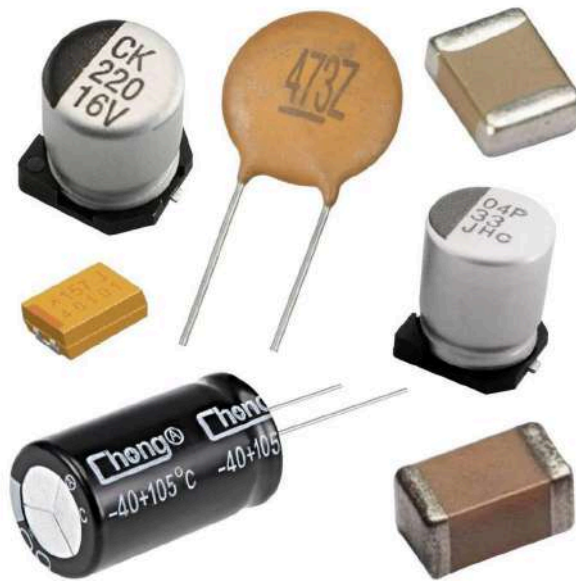
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Advantages:

1. Cheap and widely available
2. Controls and protects other parts
3. Helps in creating stable, safe circuits
4. Easy to identify and use

Capacitor



A capacitor is a passive electronic component that stores electrical energy in an electric field, created between a pair of conductors separated by an insulator (dielectric). It resists changes in voltage and is used in filtering, buffering, and timing applications.

A capacitor is like a tiny battery. It stores a bit of electricity and gives it back when needed, kind of like saving some energy for later.

Why It's Used: To store and release energy, smooth out power, filter signals, and delay or time events in a circuit.

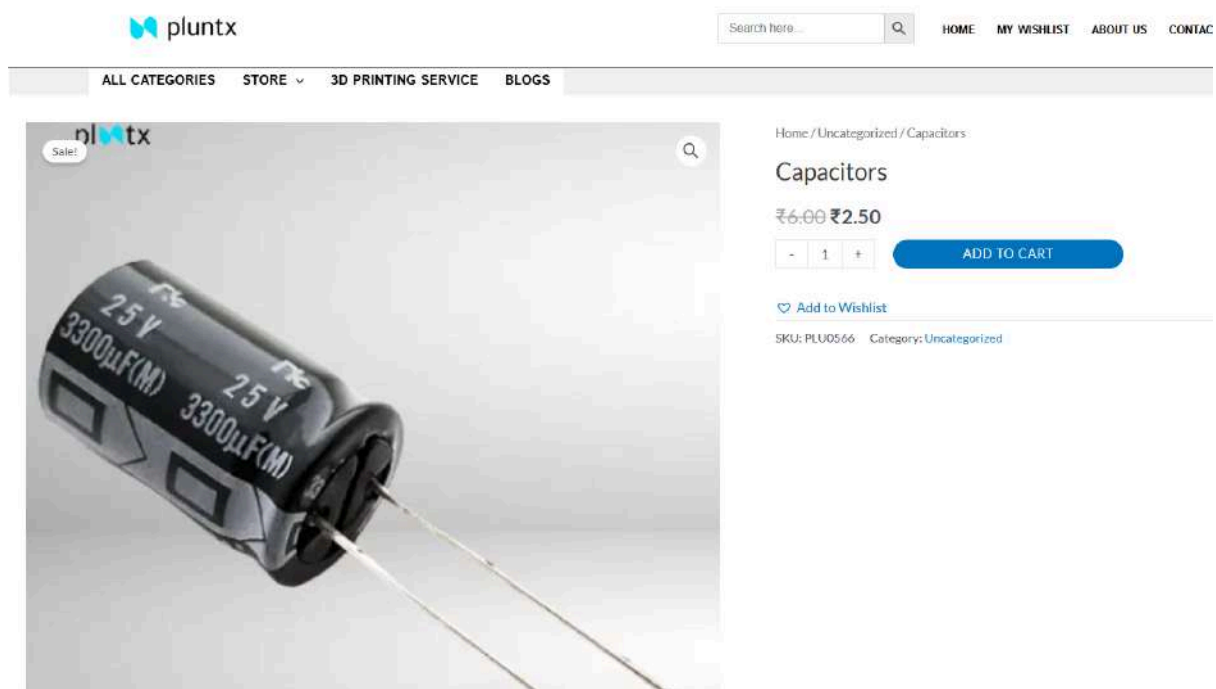
Where It's Used:

1. In power supplies to remove voltage spikes
2. In motors and fans for startup boosts
3. In timers, radios, flash circuits, etc.

How It's Used:

1. Connected to power lines to stabilize voltage
2. Used with resistors for timing circuits

3. Placed across power inputs for filtering noise



**click the image to order*

What Happens If Not Used:

1. Circuits may become unstable or noisy
2. Devices may not start or function properly
3. Power spikes can damage components

Advantages:

- Stores energy quickly
- Helps in smooth operation of circuits
- Used in many types of electronic designs
- Available in various sizes and types

Diode



A diode is a two-terminal semiconductor device that allows current to flow only in one direction. It has low resistance in the forward direction and high resistance in the reverse direction, often used for rectification, protection, and signal control.

A diode is like a one-way gate for electricity. It lets power go one way but blocks it from going back the other way.

Why It's Used: To control the direction of current, protect circuits, convert AC to DC, and prevent reverse flow.

Where It's Used:

1. In power adapters
2. Inside chargers and solar panels
3. For reverse polarity protection in gadgets

How It's Used:

1. Placed in circuits to ensure current flows in the right direction
2. Used in rectifier circuits to convert AC to DC
3. Protects batteries and boards from wrong connections

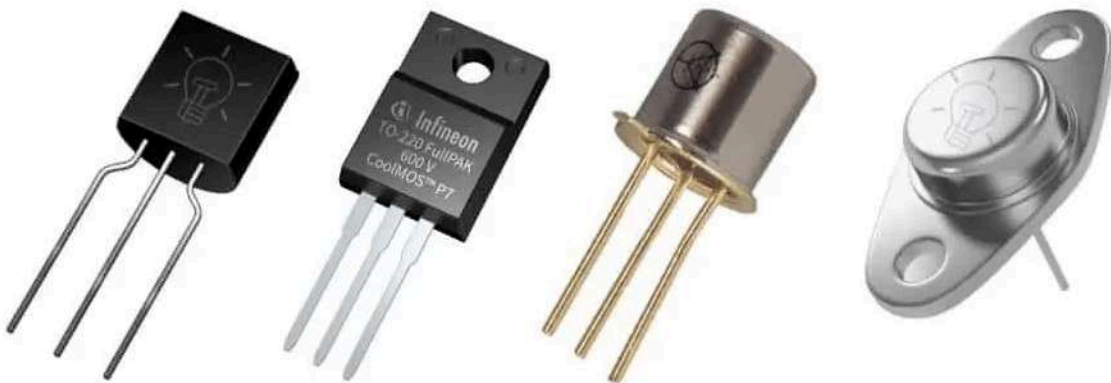
What Happens If Not Used:

1. Current may flow in the wrong direction, damaging components
2. Circuits may fail or short-circuit
3. Batteries can discharge incorrectly

Advantages:

1. Protects components
2. Controls current flow efficiently
3. Important in power conversion
4. Small, cheap, and effective

Transistor



A transistor is a semiconductor device used to amplify or switch electronic signals. It has three terminals—emitter, base, and collector—and operates by using a small current to control a larger current, making it essential for logic circuits and power control.

A transistor is like a tiny electronic switch. It can turn things on or off or make weak signals stronger.

Why It's Used: To turn circuits on/off, amplify signals, and build logic gates in computers and devices.

Where It's Used:

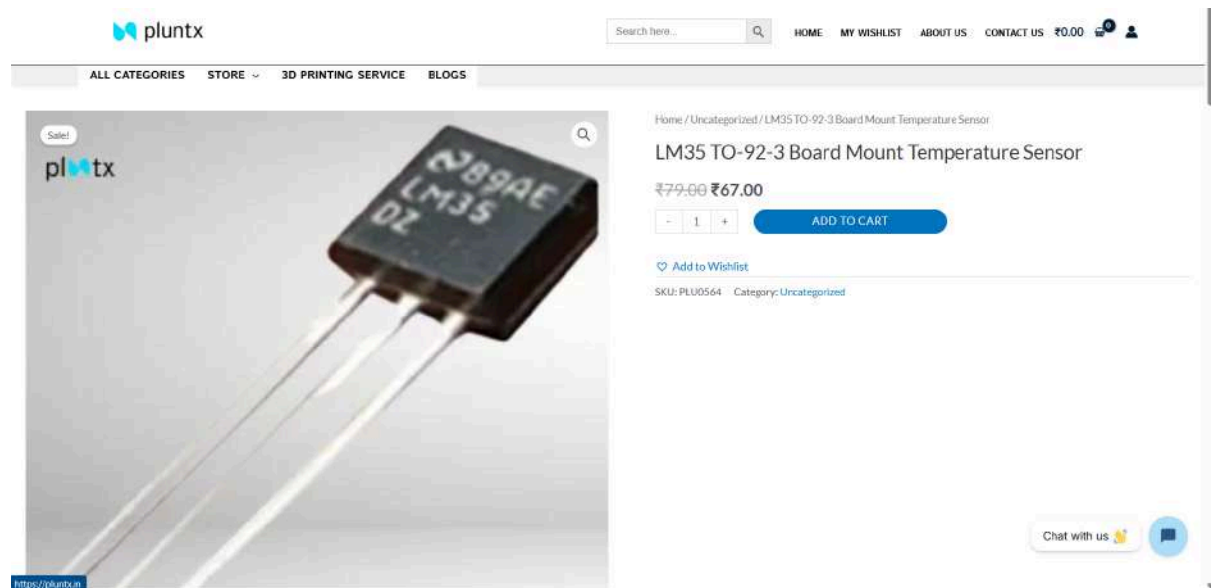
1. In computers and smartphones
2. Inside amplifiers, radios, and switches
3. In robotics and digital systems

How It's Used:

1. Used as a switch to control lights, motors, etc.
2. Used as an amplifier in audio circuits
3. Placed in logic circuits to do calculations

What Happens If Not Used:

1. Devices can't process logic or make decisions
2. Circuits can't switch or amplify signals
3. Modern tech like computers wouldn't exist

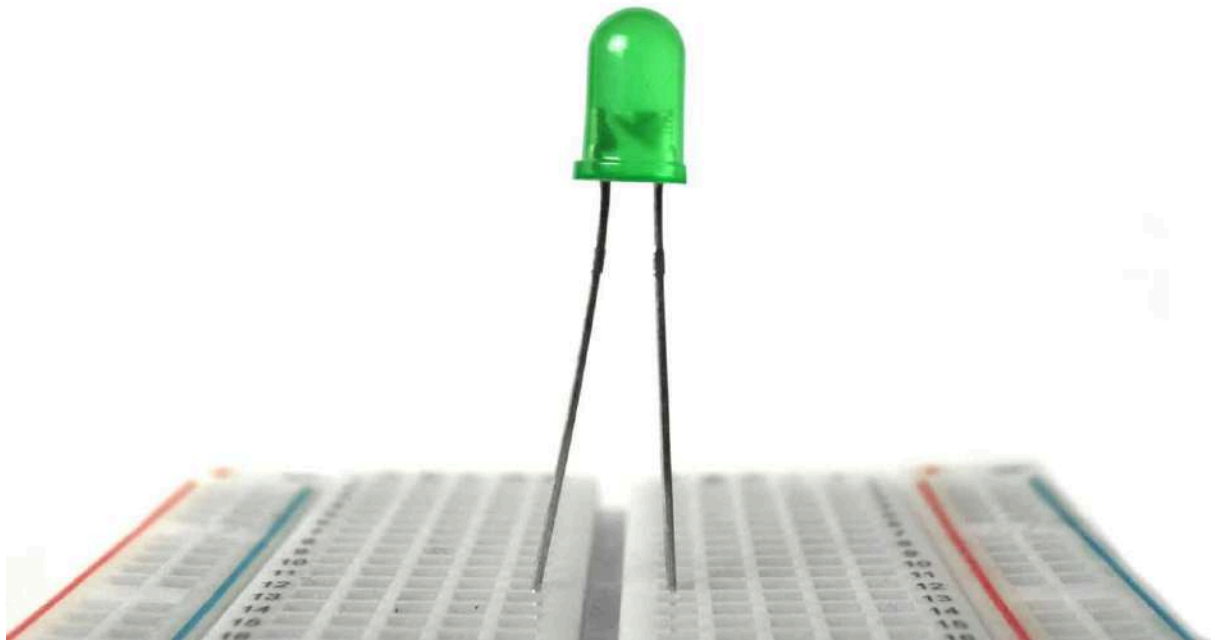


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Advantages:

1. Tiny but powerful
2. Can control big currents with tiny signals
3. Essential in all digital and analog devices
4. Used to build complex logic systems

LED (Light Emitting Diode)



An LED is a two-lead semiconductor light source that emits light when current flows through it. Electrons recombine with electron holes within the device, releasing energy in the form of photons—a process called electroluminescence. *An LED is a tiny light that turns on when electricity flows through it. It's like a little bulb that doesn't get hot and uses very little power.*

Why It's Used: To indicate power, light up displays, show signals, and save energy.

Where It's Used:

1. In TVs, remote controls, traffic lights
2. As power indicators on devices
3. In flashlights, toys, and decorations

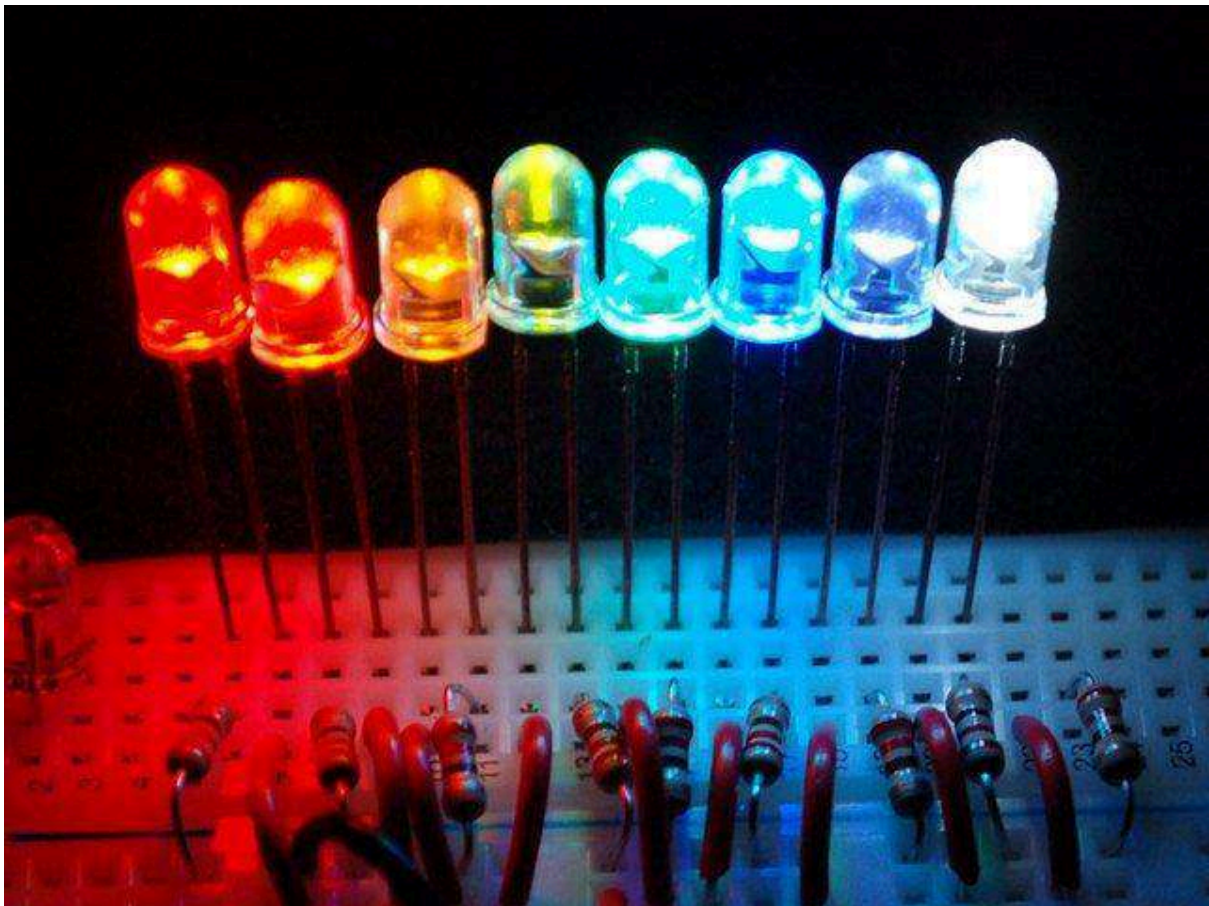
How It's Used:

1. Connected in the right direction with a resistor to limit current
2. Used in series or arrays for displays and lighting

3. Powered by low-voltage sources like batteries or USB

What Happens If Not Used:

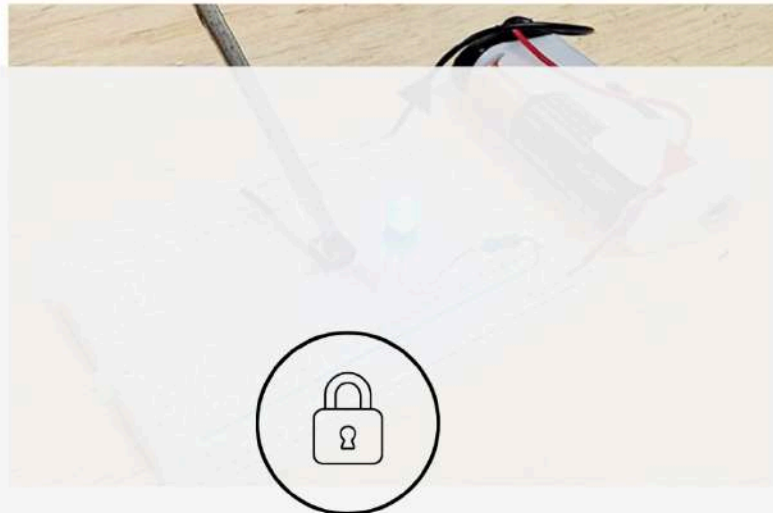
1. No visual indication of circuit activity
2. Hard to know if power is on or off
3. Energy efficiency is lost using traditional bulbs

**Advantages:**

1. Very low power usage
2. Long life and durable
3. Comes in different colors
4. Makes circuits interactive and visible

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Jumper Wire



A jumper wire is an insulated electrical wire used to establish a connection between two points in a breadboard or with other prototyping tools. It comes in various types, including male-to-male, male-to-female, and female-to-female connector types for flexible circuit routing.

A jumper wire is like a tiny cable that helps electricity travel from one part to another. It's how you "connect the dots" in your electronic project.

Why It's Used: To connect different parts of a circuit without soldering—it's like the wiring in a house but for your small project on a breadboard.

Where It's Used:

1. On breadboards and Arduino projects
2. In DIY electronics and classroom kits
3. For quick circuit testing and prototyping

How It's Used:

1. Plug one end into a hole on the breadboard, and the other where the connection is needed
2. Used to link components or power lines
3. Available in different lengths and pin types.

What Happens If Not Used:

1. Components may not be connected properly
2. The circuit won't work or give incorrect results
3. Testing becomes messy or incomplete

Advantages:

1. Reusable and flexible
2. No soldering needed
3. Helps in organizing and testing circuits quickly
4. Available in variety of types and colors for easy identification