

Top 50 Electronic Components and Example Circuits

Passive Components

- **Resistor:** Used for limiting current and voltage division. Example: LED current-limiting resistor circuit.
- **Capacitor:** Used for energy storage, filtering, and timing. Example: RC low-pass filter circuit.
- **Inductor:** Used for filtering and energy storage. Example: LC tank oscillator.
- **Potentiometer:** Variable resistance for controlling voltage. Example: Volume control circuit.
- **Transformer:** Voltage step-up/down or isolation. Example: Power supply transformer circuit.

Active Components

- **Diode:** Allows current in one direction. Example: Half-wave rectifier.
- **Zener Diode:** Maintains constant voltage. Example: Voltage regulator circuit.
- **Transistor (NPN):** Acts as switch/amplifier. Example: LED driver circuit.
- **Transistor (PNP):** Complementary to NPN. Example: Complementary push-pull amplifier.
- **MOSFET:** Voltage-controlled switch. Example: Motor driver circuit.

Integrated Circuits (ICs)

- **555 Timer IC:** Used in timing and oscillation. Example: LED flasher circuit.
- **Op-Amp (LM741):** Signal amplification. Example: Inverting amplifier circuit.
- **LM317:** Adjustable voltage regulator. Example: Variable power supply.
- **LM7805:** Fixed 5V regulator. Example: Arduino power supply circuit.
- **NE567:** Tone decoder. Example: Frequency detector circuit.

Electromechanical Components

- **Relay:** Electrically operated switch. Example: AC load control circuit.
- **Switch (SPST):** Manual on/off control. Example: Basic LED circuit.
- **Push Button:** Momentary contact. Example: Reset button circuit.
- **Buzzer:** Sound alert. Example: Door alarm circuit.
- **DC Motor:** Converts electrical to mechanical energy. Example: Fan speed control circuit.

Sensors and Modules

- **LDR:** Light sensor. Example: Automatic street light.
- **NTC Thermistor:** Temperature sensor. Example: Temperature alarm circuit.
- **IR Sensor:** Object detection. Example: Line-following robot.
- **Ultrasonic Sensor:** Distance measurement. Example: Obstacle avoidance robot.
- **Microphone:** Sound sensor. Example: Clap switch circuit.

Connectors and Others

- **Breadboard:** Temporary circuit prototyping. Example: Any beginner circuit assembly.
- **Jumper Wires:** Connections between components.
- **PCB:** Permanent circuit layout. Example: Custom amplifier board.
- **Battery:** Power source. Example: 9V battery for LED circuit.
- **LED:** Visual indicator. Example: Power-on indicator.