

# Play Tronix



## Learning objective

- Enhancing thinking Power
- Electronics and its working
- Building logics



Q.1 what elements you would need to collect in order to light a small bulb?

Q.2 how does switch can turn off and on the tube light or bulb at your home?

Q.3 Why does a flashlight turn on when you press the switch? █

Q.4 Can you think of everyday objects that use circuits to work?

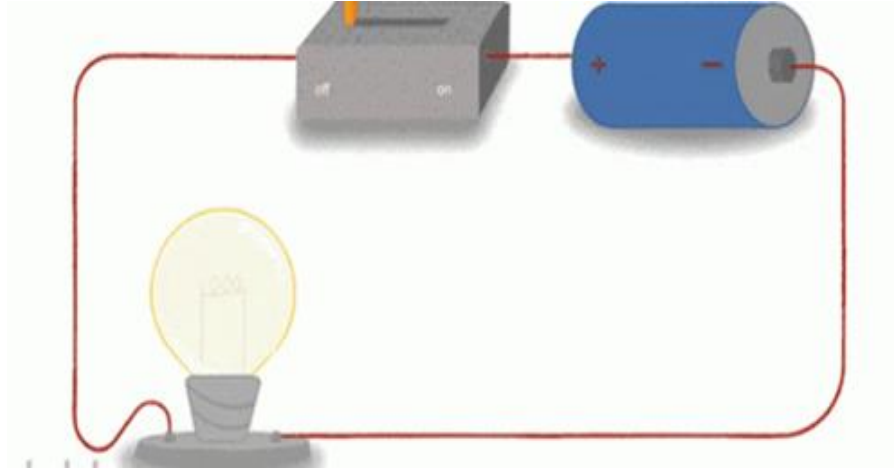
# What is circuit?



Imagine a circuit like a circle for electricity.

Have you imagine?

Have you imagine like this ?



**Have you notice something in the diagram?**

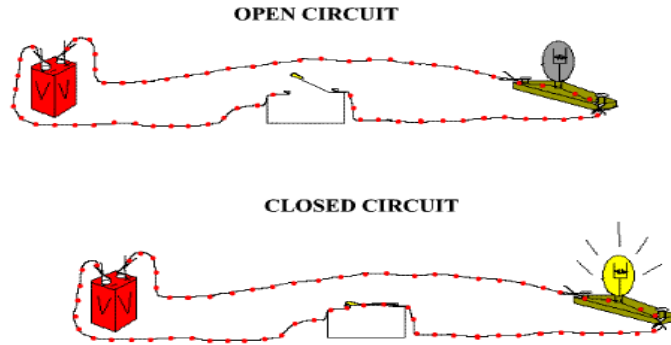


There was loop where electricity is traveling. For example, think of a flashlight. When you turn it on, you're closing the circle, letting electricity flow from the battery, through the light bulb, and back to the battery again. It's like a little path that lets the electricity do its job and make the light shine.

# Types of circuits

**Open circuit** - In contrast, an open circuit is a pathway where there is a gap or interruption, preventing the flow of electricity.

**Close circuit** - losed Circuit: In a closed circuit, there is a complete pathway for electricity to flow from the power source.



Do you know

# What is play tronix kit?



This is a kit use to play with circuits with plug and play method. Play tronix is an electronic components kit which can be used to make a normal circuit. Play tronix kit has many types of components like LED, resistor, capacitor, switches, junctions, power strip and power bank etc.

# What you will see in play tronix kit?

- Power module
- Capacitor
- Resistance
- LED
- Junction module
- Tact switch
- Potentiometer
- DIP switch
- Bupper
- Timer IC
- Two way switch
- LDR sensor
- Diode
- Transistor
- Speaker





# Power Module



What is it?

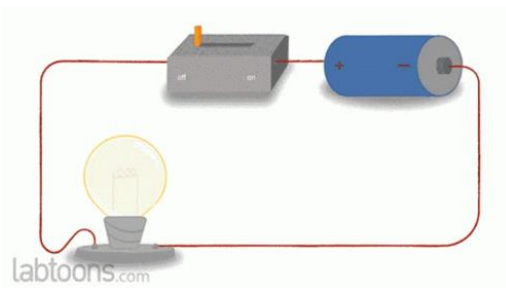
The Power Module is the main power source for the Playtronix kit. It provides a stable and consistent +5 volt power supply to the other components.

Why Use It?

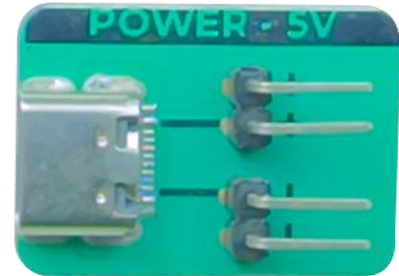
The Power Module ensures reliable and safe operation of the circuits, allowing you to build and test your projects without worrying about power fluctuations

# Power Module

- A power module essential for starting any electronic project.
- Provides the necessary power for the circuits.
- A power source provides electrical energy to the components in the kit.
- Power source could be a battery pack, USB power supply, or another power source suitable for the components included.
- Power module have two +ve and two -ve pin.



Power Module



# Do you know the application of power module?

**Power Supplies:** Power modules are often used in AC-DC or DC-DC power supplies to convert and regulate voltages efficiently. They ensure stable output voltages suitable for powering electronic devices and circuits.

**Motor Drives:** In electric motors and motor control systems, power modules are employed to manage the power delivery to the motor, ensuring smooth operation and efficient energy use.

**Medical Devices:** Power modules are crucial in medical equipment for ensuring reliable and safe power supply to devices like imaging systems, patient monitors, and surgical instruments.

**Consumer Electronics:** In devices like smartphones, laptops, and gaming consoles, power modules help manage battery charging, voltage regulation, and power efficiency.

# Resister

What is it?

A resister is a passive two-terminal electronic component that resists the flow of electric current. It does this by converting electrical energy into heat.

Why Use It?

Resistors are commonly used to limit the amount of current flowing through a particular part of a circuit.

Resistors can be used to create a specific voltage output from a higher voltage source.

This is crucial to prevent components such as LEDs, transistors, and integrated circuits from being damaged by excessive current.

# Applications Resistor



1

## Current Control

Resistors are used to limit the flow of electric current in a circuit, protecting sensitive components from damage.

2

## Voltage Division

Resistors can be used to create voltage dividers, allowing you to adjust and control the voltage levels in a Playtronix project.

3

## Biasing Circuits

Resistors are essential for biasing other components, such as transistors, to ensure they operate within their desired parameters.

# Transistor



have you seen transistor previously?



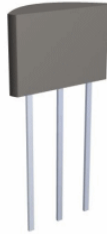
What is transistor?

How Do Transistors Work?

When a small current flows through the base, it controls the flow of a much larger current between the emitter and the collector.

# Transistor

A transistor is a semiconductor device used to amplify or switch electrical signals and power. It is one of the basic building blocks of modern electronics. It is composed of semiconductor material, usually with at least three terminals for connection to an electronic circuit.



# Transistor

- 1 — **Emitter:** Emits majority charge carriers into the base.
- 2 — **Base:** Controls the flow of current carriers from the emitter to the collector.
- 3 — **Collector:** Collects the majority charge carriers that pass through the base region



# Applications of transistor

1

## Amplification

Transistors can be used to amplify signals, allowing you to increase the strength of a weak input signal and drive more powerful output devices.

2

## Switching

Transistors can act as digital switches, turning on and off in response to control signals, making them essential for logic and control circuits.

3

## Voltage Regulation

Transistors can be configured to regulate voltage, maintaining a stable output even with fluctuations in the input, ensuring reliable power for your Playtronix projects.

# Capacitor



## What is a Capacitor?

A capacitor is a passive electronic component that stores electrical energy in an electric field. It consists of two conductors separated by an insulator, allowing it to store and release charge.



# Why Use a Capacitor?

- 1** — **Filtering** → Capacitors can be used to filter out unwanted signals or noise, and bypass AC signals around components.
- 2** — **Energy Storage** → Capacitors can store energy and release it when needed, making them useful in power supplies and timing circuits.
- 3** — **Decoupling** → Capacitors can decouple (allows us to separate simple components in a complex system) different sections of a circuit, preventing interference and ensuring stable operation.

# Applications of Capacitors

## Power Supplies

Capacitors are used in power supplies to smooth out ripple and provide a stable voltage.

## Timing Circuits

Capacitors are used in timing circuits, such as in oscillators and clocks, to control the timing of signals.

## Coupling and Filtering

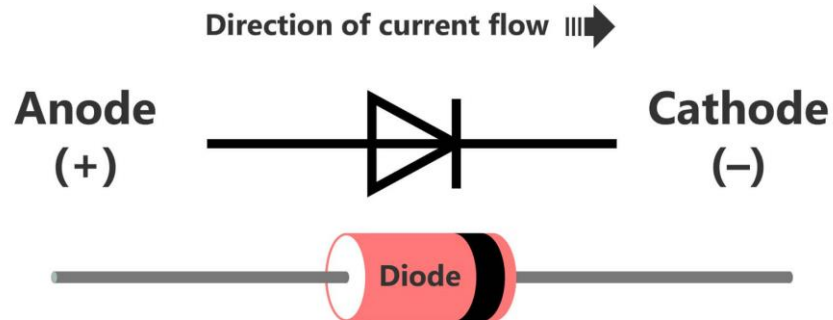
Capacitors are used to couple signals between stages of a circuit and to filter out unwanted frequencies.

# Diode



## What is a Diode?

A diode is a two-terminal electronic component that allows the flow of electric current in only one direction. It is a fundamental building block of many electronic devices and circuits.



# Why Use a Diode?

## Rectification

Diodes are used to convert alternating current (AC) into direct current (DC).

## Voltage Regulation

Diodes can be used in voltage regulator circuits to maintain a stable output voltage.

## Signal Conditioning

Diodes can be used to shape and condition electronic signals, such as in clipping and clamping circuits.

# Applications of Diodes

## 1 Power Supplies

Diodes are used in power supplies to convert AC to DC.

## 2 One-Way Valve

Diodes act as one-way valves, allowing the flow of electric current in only one direction. This property makes them essential for rectification, signal conditioning, and protection circuits.

## 3 LED Circuits

Light-emitting diodes (LEDs) are a specialized type of diode that emit light when current flows through them.

# What is a Potentiometer?

A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. It is used to control or measure voltage in various electronic circuits.





# Why Use a Potentiometer?

1

## Volume Control

Potentiometers are commonly used to control the volume in audio equipment.

2

## Speed Control

Potentiometers can be used to control the speed of electric motors and other devices.

3

## Sensor Input

Potentiometers can be used as sensors to measure position, rotation, or other physical quantities.

# Applications of Potentiometers

Audio Equipment

Volume control, tone control

Motor Control

Speed control, position control

Instrumentation

Measurement of physical quantities, calibration

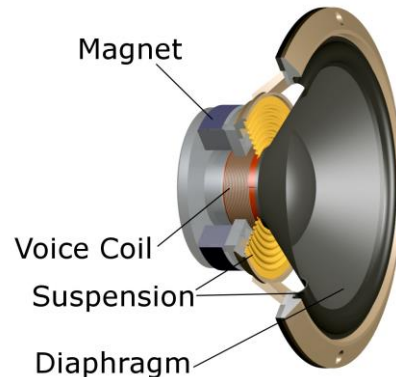
Industrial Applications

Process control, adjustment of parameters

# Speaker

## What is Speaker?

Speakers are essential audio components that convert electrical signals into audible sound waves. This is achieved by transforming electrical energy into mechanical energy, which creates pressure waves that travel through the air as sound.



# Why Use a Speaker?

## Amplification

Speakers amplify electrical signals, making sounds louder and more powerful.

## Immersive Experience

Speakers create a more immersive and engaging listening experience, surrounding the listener with sound.

## Versatility

Speakers can be used in a wide range of applications, from home entertainment to professional sound systems.

## Applications of Speakers

### Home Audio

Speakers are used in TVs, stereos, and home theater systems to provide high-quality sound for entertainment.

### Public Address

Speakers are essential for public address systems, amplifying and distributing sound in large venues, such as concerts and conferences.

### Automotive Audio

Speakers are integrated into car audio systems, allowing drivers and passengers to enjoy music and other audio content while on the road.

# Introducing the Multimeter

## 1 Versatile Measurement Tool

A multimeter is a handheld device that can measure various electrical properties, such as voltage, current, and resistance.

## 2 Troubleshooting Capabilities

Multimeters are essential for diagnosing and troubleshooting electrical circuits and components.

## 3 Precision and Accuracy

Multimeters provide precise and accurate measurements, making them indispensable for electrical work and maintenance.



# Why Use a Multimeter?

1

## Measure Voltage

Multimeters can determine the voltage across a circuit or component, helping to identify power issues.

2

## Measure Current

Multimeters can measure the flow of electric current, which is crucial for troubleshooting and understanding circuit behavior.

3

## Measure Resistance

Multimeters can measure the resistance of a component or circuit, aiding in the identification of faults and malfunctions.

# Applications of Multimeters

## Electrical Maintenance

Multimeter are essential for troubleshooting and repairing electrical systems and appliances.

## Automotive Diagnostics

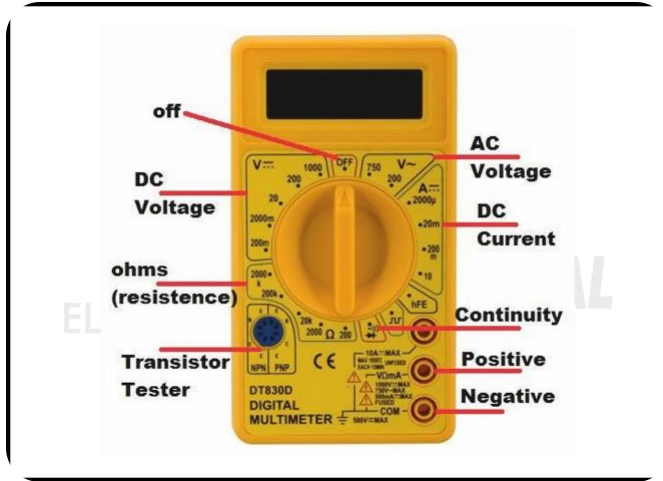
Multimeters are used to diagnose and repair issues in vehicle electrical systems.

## Electronics Repair

Multimeters help identify and fix problems in electronic devices and circuits.

## HVAC Systems

Multimeters are used to maintain and troubleshoot heating, ventilation, and air conditioning systems.





# LED

## What is LED?



1

### Light Emitting Diode

An LED is a semiconductor device that emits light when an electric current passes through it.

2

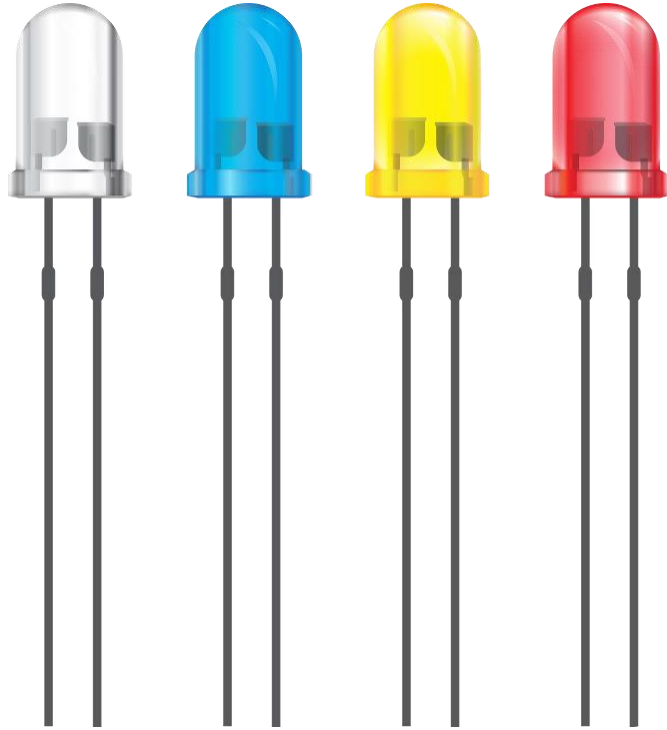
### Energy Efficiency

LEDs are highly efficient, converting more energy into light compared to traditional light sources.

3

### Long Lifespan

LEDs have an exceptionally long lifespan, often lasting tens of thousands of hours.



## Applications of LEDs

- LED is used as a bulb in the homes and industries
- The light-emitting diodes are used in motorcycles and cars
- These are used in mobile phones to display the message
- At the traffic light signals LED's are used

# BEEPER

## What is BEEPER?

Beeper is an electronic device that produces a sound when an electrical current is passed through it.

It is also known as a buzzer or piezo buzzer.



## Why Use a Beeper?

### Immediate Notification

Beepers provide instant alerts, ensuring users don't miss important messages or updates.

### Discreet Communication

Beepers allow for subtle, hands-free communication, making them useful in situations where phone calls may be disruptive.

### Reliability

Beepers are often more reliable than cellular networks, especially in areas with poor coverage.

# Applications of Beepers

## Healthcare

Nurses, doctors, and other healthcare professionals use beepers to receive critical patient updates and emergency alerts.

## Hospitality

Restaurants and hotels use beepers to notify customers when their table or room is ready.

## Security

Security personnel rely on beepers to communicate discreetly and coordinate responses to incidents.

# LDR Sensors

## What is LDR Sensors?

An LDR (Light Dependent Resistor) sensor is an electronic component that changes its resistance based on the amount of light it is exposed to. It is a type of photoresistor that is sensitive to the intensity of light.



## Why Use LDR Sensors?

### 1 Light Level Detection

LDRs can be used to detect changes in ambient light levels, enabling automated lighting control systems.

### 2 Brightness Adjustment

LDRs can adjust the brightness of displays, such as in smartphones and televisions, based on the surrounding light conditions.

### 3 Motion Sensing

LDRs can be used in security systems to detect the presence of people or objects by sensing changes in light levels.

## Applications of LDR Sensors

### Automatic Lighting

LDRs can control the activation and brightness of lights based on ambient light levels, improving energy efficiency.

### Burglar Alarms

LDRs can detect the interruption of light beams, triggering alarms in security systems.

### Camera Exposure Control

LDRs can adjust the camera's exposure settings to capture better images in varying light conditions.

### Phototherapy

LDRs are used in medical devices to monitor and control the intensity of light for phototherapy treatments.



# Timer ICs

Do you know ?



How car indicator blink with the respect of time ?

1. Have you notice how it can be possible
2. Do any person is opening and closing the circuit ?
3. There is a huge circuit behind this?

Let's discuss about the Timer IC....

# Timer ICs

Have you seen Timer IC?



What is Timer IC?

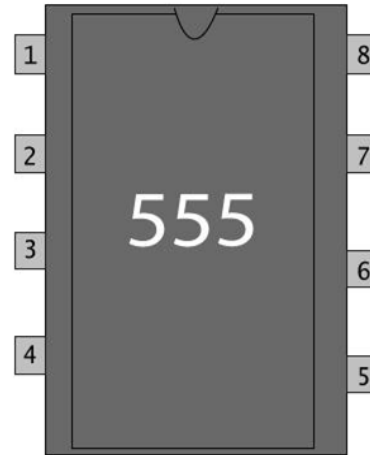
This an integrated circuit which allow to control electronic components with the respect of time.

# Timer ICs

IC timers are programmable semiconductor circuits that generate or set timing for electronic circuits, generate precise time delays or oscillations. IC timer requires a supply voltage of 4.5 to 16 volts and an operating current range of 3 mA.

There are 8 Pin in timer IC

- Ground
- Trigger
- Output
- Reset
- Control
- Threshold
- Discharge
- Vcc



# Pins Working of Timer IC

Pin	Name	Purpose
1	GND	Ground reference voltage, low level (0 V)
2	TRIG	When the volt drop below $\frac{1}{3}$ means 1.7 volt it turn on the output
3	OUT	Its give the electric pulse to on or off the light
4	RESET	This pin is use to start the circuit from the starting position
5	CTRL	Its control the trig and threshold value and speed of time clock.
6	THR	Its turn on when the value is above $\frac{2}{3}$ means 3.3 volt
7	DIS	This is use to discharge the capacitor..
8	Vcc	Positive supply voltage, which is usually between 3 and 15 V

# Why Use Timer ICs?

## ① Precision Timing

Timer ICs can accurately control and measure time intervals, making them essential for various timing-sensitive applications.

## ② Flexibility

Timer ICs can be programmed to perform a variety of timing functions, from delay, interval, and pulse generation to frequency division and oscillation.

## ③ Energy Efficiency

Timer ICs can be designed to operate in low-power modes, making them suitable for battery-powered or energy-conscious devices.

# Applications of Timer ICs



**Indicators**



**Traffic Lights**



**Diwali Light**

# Tact Switch

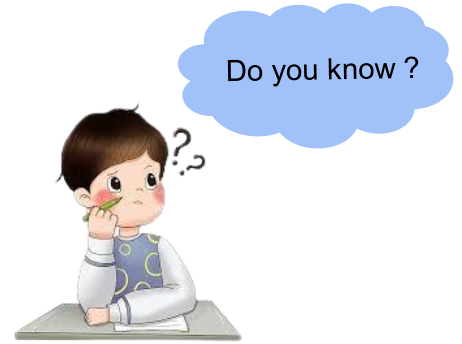
How computer keyboard keys work?

When we press key it ups automatically

Have you notice how it can does

How mobile phone button works?

How calculator keys work?



# Tact Switches

A tact switch is designed to provide a tactile feedback when pressed, allowing users to easily feel the response of the switch.





# Why Use a Tact Switch?

## 1 Precise Control

Tact switches offer precise control and feedback, making them ideal for applications where accurate button presses are essential.

## 2 Reliability

Tact switches are known for their durability and long lifespan, ensuring consistent performance over time.

## 3 Versatility

Tact switches come in a variety of sizes, shapes, and actuation forces, allowing them to be used in a wide range of devices and applications.

# Tact Switch Applications

## **Consumer Electronics**

Tact switches are commonly used in remote controls, keyboards, and various consumer electronic devices to provide tactile feedback.

## **Industrial Equipment**

They are also used in industrial machinery, control panels, and automation systems to ensure reliable and precise control.

## **Medical Devices**

Tact switches are often found in medical equipment, such as diagnostic tools and life-support systems, where reliable input is crucial.

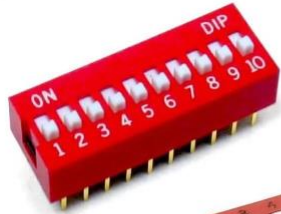
# DIP Switches

## What is DIP Switch?

A DIP (Dual Inline Package) switch is a type of switch that is commonly used in electronic devices. It consists of multiple individual switches arranged in a single package, allowing for easy configuration and customization.



# Why Use a DIP Switch?



Slide Dip Switch



Rocket Dip Switch



Piano Dip Switch

[www.dipelectronicslab.com](http://www.dipelectronicslab.com)

1

## Customization

DIP switches enable users to easily customize the behavior of electronic devices by adjusting the switch settings.

2

## Compact Design

Their compact size makes DIP switches suitable for use in space-constrained electronic devices and circuit boards.

3

## Reliability

DIP switches are known for their durability and long lifespan, making them a dependable choice for various applications.

# DIP Switch Applications

## **Configuration Settings**

DIP switches are commonly used to configure settings, such as network addresses, operating modes, and feature selections, in a wide range of electronic devices.

## **Troubleshooting**

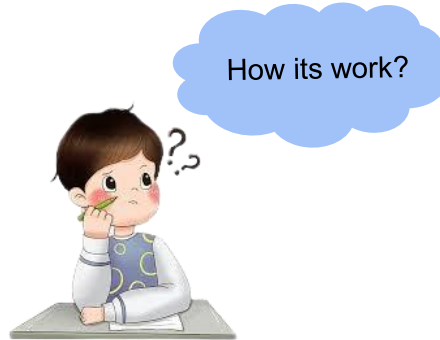
They can also be used for troubleshooting and diagnostics, allowing technicians to easily test and adjust the behavior of electronic systems.

## **Legacy Equipment**

DIP switches are often found in older or legacy electronic equipment, where they provide a simple and reliable way to adjust settings and configurations.

## Two-Way switch

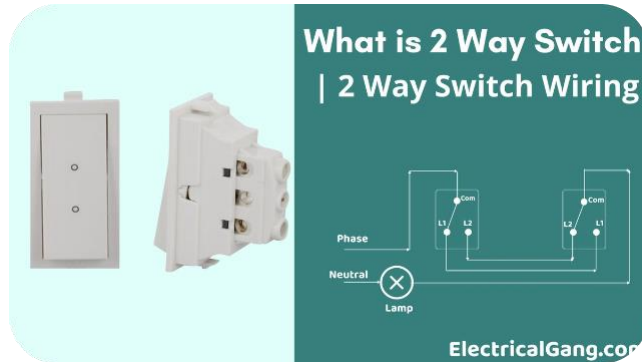
How one bulb is controlled by two switches from two different positions in staircase?




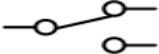
# Two-Way Switch

## What is Two-Way Switches

A two-way switch, also known as a "light switch," is a type of electrical switch that allows you to control a light or other electrical device from two different locations.



# Difference between One-Way and Two-Way Switch

Basis of Difference	One-Way Switch	Two-Way Switch
Definition	A type of electric switch which has two terminals and is used to conduct current only in one direction is called a one-way switch.	A two-way switch is the one which has three terminals and can conduct current in either directions.
Circuit symbol		
Number of terminals	One way switch has two terminals.	There are three terminals in a two-way switch.
Working	A one way switch makes or breaks an electric circuit to operate an electric appliance	In a two way switch, two terminals are connected at a time to operate an electric appliance, and the third one is left open.
ON and OFF positions	A one-way switch has definite ON and OFF positions.	The ON and OFF positions are not specific in case of a two-way switch, it depends upon the connection of the switch.
Circuit complexity	The circuit of a one-way switch to control an electric device is simple.	A two-way switch involves a relatively complex circuit than a one-way switch.



# Why Use a Two-Way Switch?

- 1 Convenience**

Two-way switches provide added convenience by allowing you to control a light or device from multiple locations, such as the top and bottom of a staircase.
- 2 Flexibility**

They offer flexibility in how you can arrange and control your lighting and electrical systems, making them a popular choice for many homes and buildings.
- 3 Safety**

Two-way switches can enhance safety by allowing you to control lighting from multiple points, especially in areas where visibility or access may be limited.

# Two-Way Switch Applications

## Residential Lighting

Two-way switches are commonly used in homes to control lighting fixtures, such as overhead lights, lamps, and stairway lighting, from multiple locations.

## Commercial Buildings

They are also used in commercial and industrial settings, such as offices, schools, and warehouses, to provide convenient control of lighting and electrical systems.

## Energy Efficiency

Two-way switches can contribute to energy efficiency by allowing you to turn lights on and off from multiple locations, reducing the need to walk to a single switch.

# Junction Module

A junction module is an electrical device that serves as a central point of connection for multiple electrical circuits or components. It facilitates the distribution and management of electrical signals, power, or communication within a system.



# Work of Junction Modules

## Power Distribution

Junction modules can distribute power from a single source to multiple destinations, ensuring efficient and reliable power delivery.

## Signal Routing

Junction modules can route control signals, sensor data, or communication protocols between various components and subsystems.

## Interconnectivity

Junction modules provide a central point of connection, allowing for easy integration and configuration of different electrical systems.

# Electrical Components and Connections

## Propeller

A small, rotating device used to generate thrust or airflow in various applications, such as drones and model aircraft.



## Jumble Wires

A tangled or disorganized bundle of electrical wires, which can make it challenging to identify and manage individual connections.



## Cables

Flexible, insulated conductors used to transmit electrical signals or power between different components or devices.



## Connectors

Devices that join two or more electrical components, allowing the flow of electricity and data between them.



# Lets have one simple activity with play Tronix

## Activity 1- Led glowing

Step.1 assemble the components at ones place

1. Power module with cable
2. Led module
3. Connecting wire's (Black and white)

Step.2 Take the power module and LED connect +ve side of power module to +ve side of LED using connecting wires.

Step.3 after that connect -ve side of power module to -ve side of LED using connecting wires.

Step.4 now,connect the power cable with power module

**Its glowing!!**

