

# INTRODUCTION

The wireless AC current detector is an innovative device that has been developed to detect and measure the presence and magnitude of alternating current (AC) in a wire without any physical contact. This device is designed to be used in a variety of applications, including electrical maintenance, repair, and monitoring of electrical equipment. The wireless capability of this device makes it an excellent tool for remote monitoring and allows for increased convenience and flexibility for the user.

The device operates on the principle of detecting the magnetic field generated by the AC current passing through a wire. It uses a magnetic field sensor to measure the strength of the magnetic field, and the data is wirelessly transmitted to a receiver, which displays the magnitude of the AC current. This technology provides a non-invasive way of measuring AC current, eliminating the need for physical contact with the wire, and reducing the risk of electrical shock or damage to equipment.

The wireless AC current detector is a valuable tool for electricians, maintenance personnel, and anyone who needs to monitor AC current in real-time. This device can help identify problems with electrical equipment and detect the presence of live wires, enhancing safety and efficiency in the workplace.



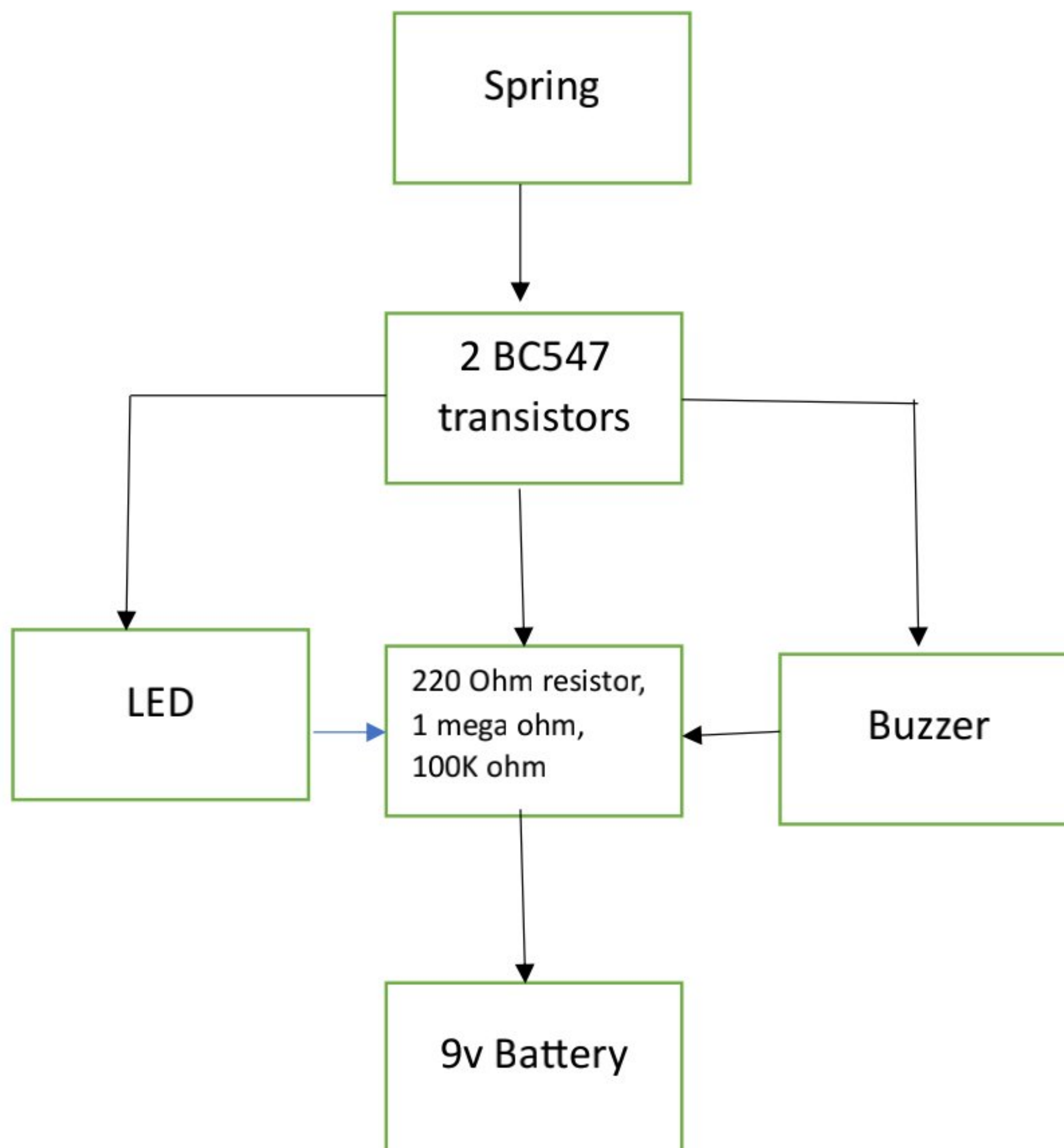
## **PROPOSED SYSTEM**

The proposed system of the wireless AC current detector consists of two main components: a sensor unit and a receiver unit. The sensor unit is responsible for detecting the AC current in the wire and wirelessly transmitting the data to the receiver unit. The receiver unit receives the data and displays the magnitude of the AC current.

The sensor unit is composed of a magnetic field sensor, a microcontroller, a wireless transceiver module, and a power source. The magnetic field sensor is used to measure the magnetic field generated by the AC current passing through a wire. The microcontroller processes the data from the magnetic field sensor and transmits the data wirelessly using the wireless transceiver module. The power source provides power to the sensor unit.

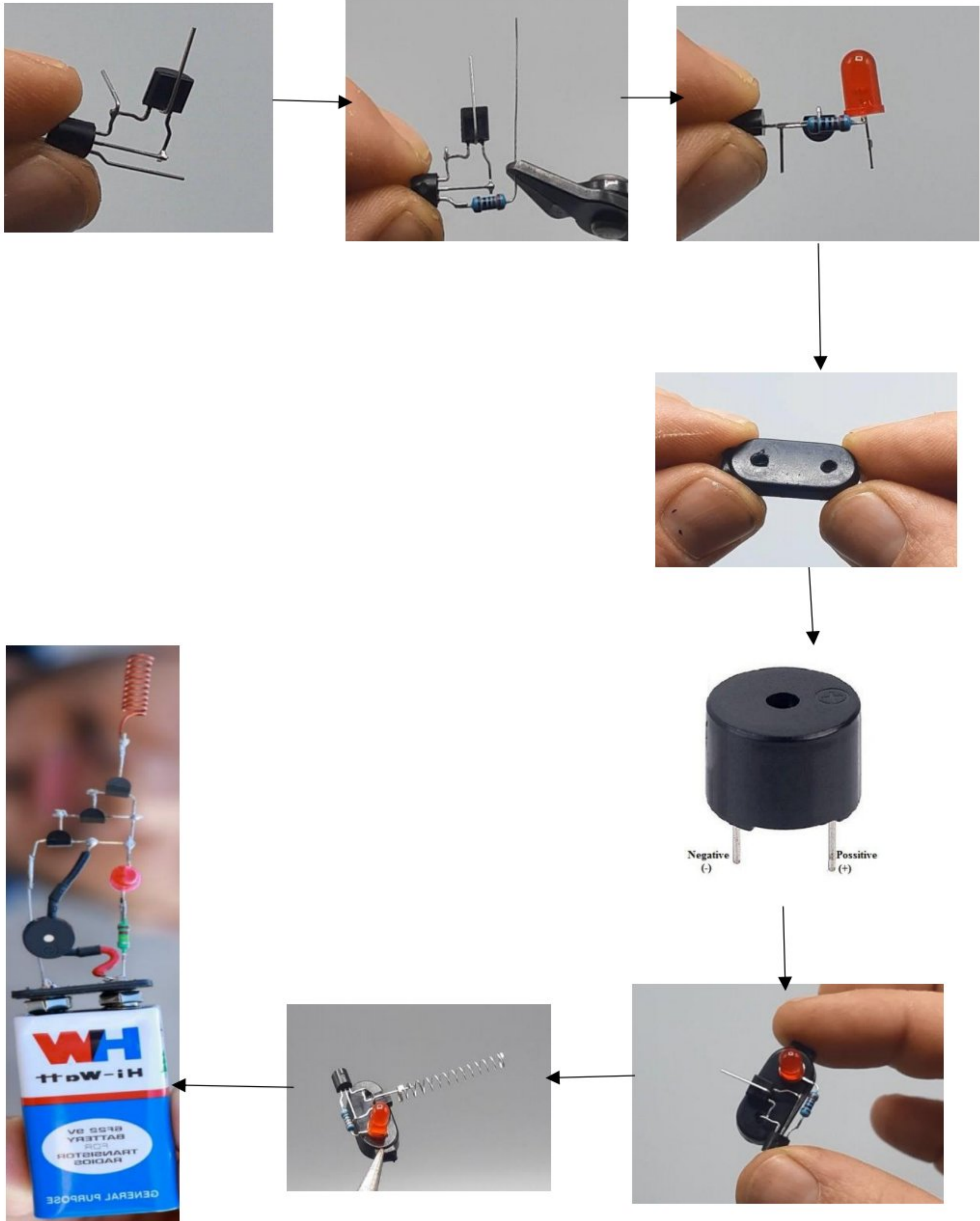
The proposed system offers several advantages over traditional AC current detection methods. It provides a non-invasive way of measuring AC current, eliminating the need for physical contact with the wire, and reducing the risk of electrical shock or damage to equipment

## BLOCK DIAGRAM





## FLOW DIAGRAM

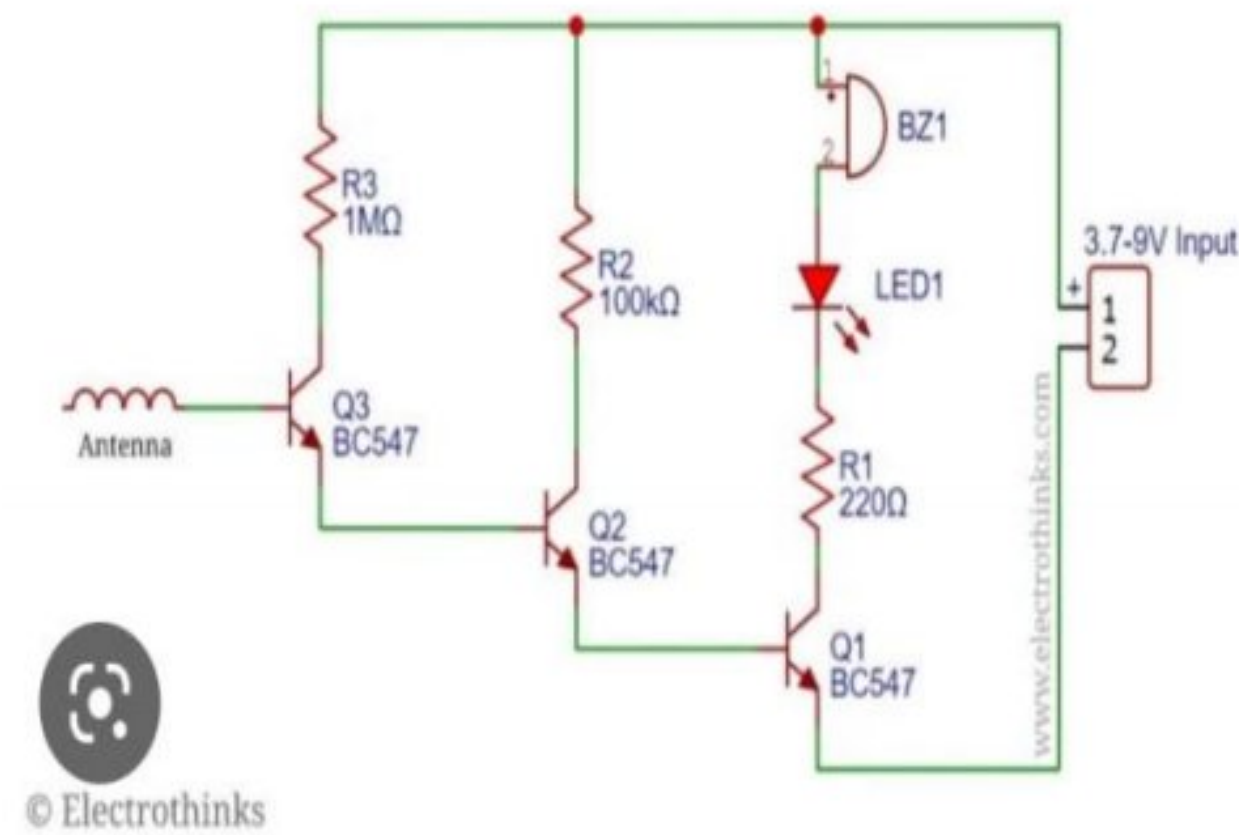


OUTPUT

# CIRCUIT DIAGRAM

## DESCRIPTION

Non-Contact AC Line Detector Circuit Diagram



A non-contact AC line detector is a device that can detect the presence of alternating current (AC) in a wire or cable without the need for physical contact. This type of detector is commonly used by electricians and other professionals who work with electrical systems to determine if a wire or cable is energized and therefore potentially hazardous.

## HARDWARE REQUIREMENT

In This Project We Use the Hardware Requirements are

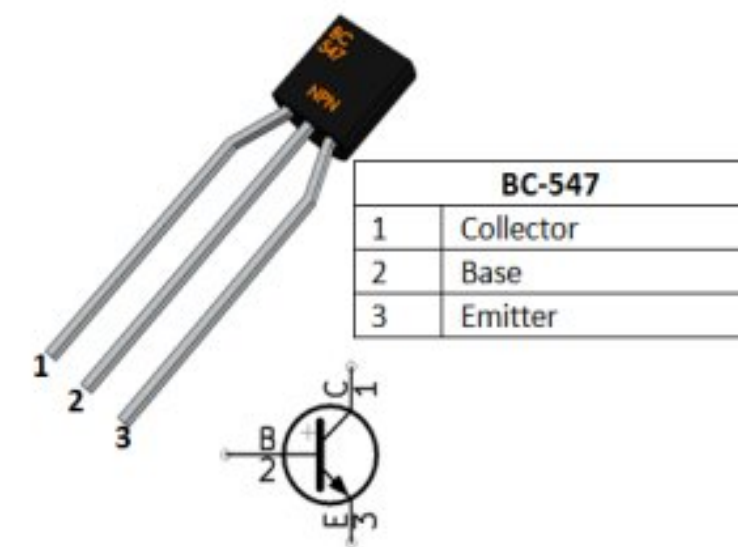
- 2 BC547 transistors
- LED



- 220 Ohm resistor
- Buzzer
- Spring (ballpoint spring or copper wire)
- 9V Battery
- 9V Battery clip

## BC547 Transistor

The BC547 is a general-purpose NPN bipolar junction transistor (BJT).



It is commonly used in low-power amplification and switching circuits due to its low noise and high gain characteristics.

The BC547 transistor has three terminals: the emitter, base, and collector. The emitter is connected to the negative side of the circuit, while the collector is connected to the positive side. The base is the control terminal that allows current to flow between the emitter and collector.

## Applications

- Driver Modules like Relay Driver, LED driver etc..

- Amplifier modules like Audio amplifiers, signal Amplifier etc.
- Darlington pair

## **LED (Light Emitting Diode)**

LED stands for Light Emitting Diode.

It is a type of semiconductor device



that emits light when a current flows through it in the forward direction.

An LED is composed of a semiconductor material, usually a combination of gallium, arsenic, and phosphorus, which is doped with impurities to create a p-n junction. When a voltage is applied to the p-n junction in the forward direction, electrons flow across the junction, recombining with holes and releasing energy in the form of light.

### **Advantages of LEDs**

Some advantages of LEDs are:

- LEDs consume less power, and they require low operational voltage.



- No warm-up time is needed for LEDs..

## Resistor

A resistor is an electronic

component that has a resistance value

of 220 ohms, which is a measure of how much it resists the flow of electrical current through it.



Resistors are one of the most commonly used electronic components and they are used to limit the current flow, control voltage levels, and create voltage drops in electronic circuits.

The resistance value of a resistor is indicated by a color code system printed on the resistor body. A 220 ohm resistor typically has color bands of red, red, brown, and gold. This color code indicates the first two bands (red, red) represent the first two significant digits (22), the third band (brown) represents the multiplier ( $10^1$ ), and the fourth band (gold) represents the tolerance ( $\pm 5\%$ ).

In practice, a 220-ohm resistor might be used in a variety of applications such as LED current limiting, voltage dividers,



and biasing in transistor circuits. A resistor (also known as an electrical resistor) is defined as a two-terminal passive electrical element that provides electrical resistance to current flow. Resistance is a measure of the opposition to the flow of current in a resistor. The larger a resistor's resistance, the greater the barrier against the flow of current. There are many different types of resistors, such as a thermistor.

## Advantages of Resistors

- Simple working principle and construction
- Compact size
- **BUZZER**

Buzzer is an electronic device that produces a sound or noise when an electrical current is passed through

it. It typically consists of a coil of wire that surrounds a metal or plastic core, and a thin, flexible metal or plastic diaphragm that vibrates rapidly when the coil is activated.

When an electrical current is applied to the buzzer, the coil creates a magnetic field that pulls the diaphragm towards it,





causing it to vibrate. The vibration of the diaphragm creates sound waves that travel through the air, producing the buzzing or humming noise that is characteristic of a buzzer.

## **Working Principle**

The working principle of a buzzer depends on the theory that, once the voltage is given across a piezoelectric material, then a pressure difference is produced. A piezo type includes piezo crystals among two conductors.

## **Advantages**

The **advantages of a buzzer** include the following.

- Simply Compatible
- Frequency Response is Good

## **Battery**

A 5V rechargeable battery is a type of lithium-ion battery that can be recharged using a USB port.



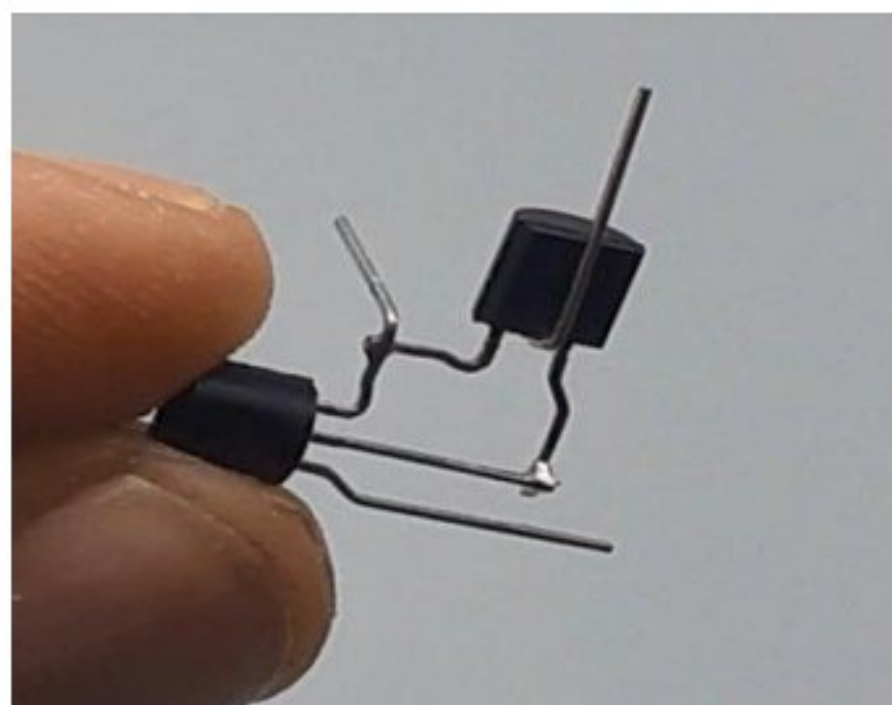
This makes it convenient for powering devices that are frequently used, such as digital cameras and portable



speakers. The average capacity of a 5V rechargeable battery is 2000mAh, which means it can provide up to 2 hours of continuous use. as a 5V battery. The voltage of a battery depends on its chemistry and design. Common battery types include alkaline, lithium-ion, nickel-cadmium, and lead-acid batteries, among others.

## **HOW TO CONNECT THE CIRCUIT DIAGRAM**

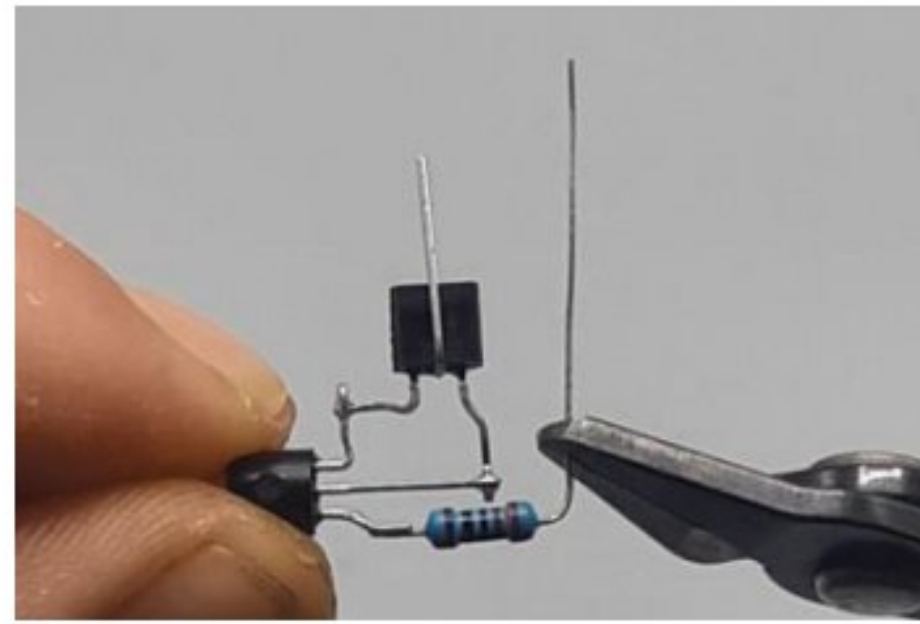
### **1) Connecting the Transistors**



- Bend the collector of transistor 1 ninety degrees
- Bend the base of transistor 1 all the way over the transistor
- Bend the collector of transistor 2 ninety degrees
- Connect the emitter from transistor 1 to the base of transistor 2

- Connect the collector from transistor 1 to the collector of transistor 2
- Cut off the protruding ends
- Bend the protruding end where the collectors are connected 90 degrees

## 2) Connecting the Resistance



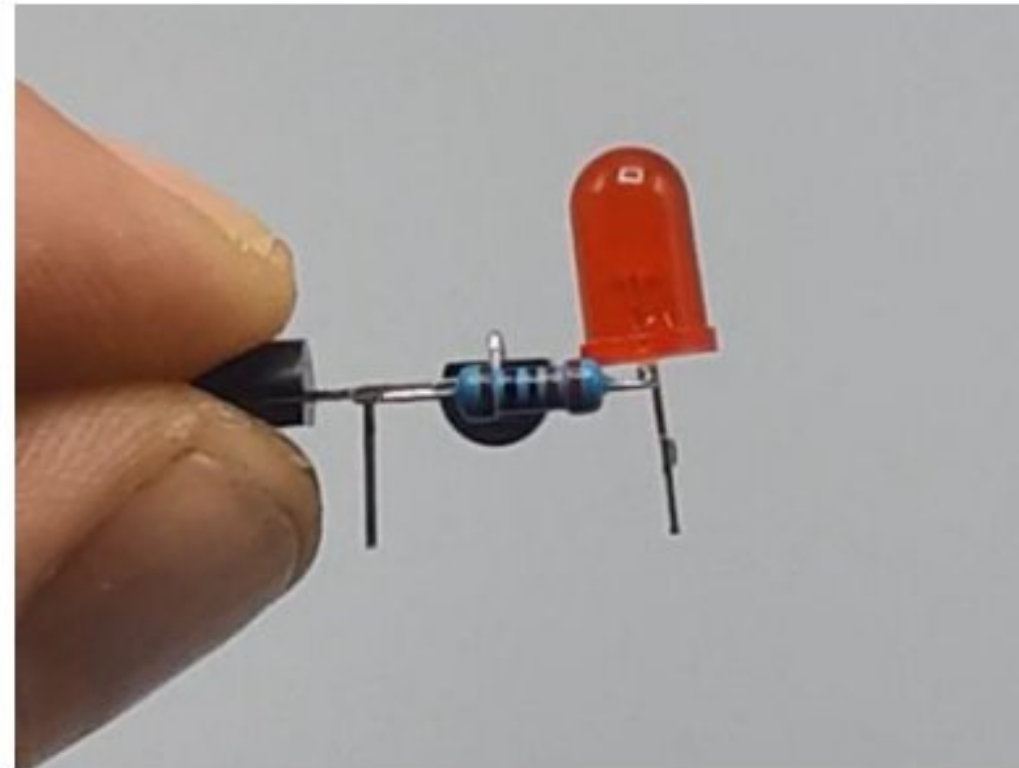
The second transistor controls the LED. A resistor must intervene here to protect the LED. In this circuit, I am using a 220-ohm resistor.

The resistor can be placed in front of or behind the LED and works the same in both directions. To keep the whole compact so that it can be placed on the battery connector later, it comes directly after the transistor.

- Solder the resistor to the emitter (output) of the second transistor.
- Bend the other pin 90 degrees and cut it shortly after the bend.



### 3) Connecting the LED



- Bend the anode (+) of the LED 90 degrees and cut it to a few millimeters.
- Solder the anode to the resistor.
- Cut the cathode (-) to the same length as the pin protruding from the connected emitters.

The 2 protruding pins should have about the same pitch as the 2 connectors of the battery connector. This is because the whole can be mounted on the battery connector later.

### 4) Prepare the Connector.



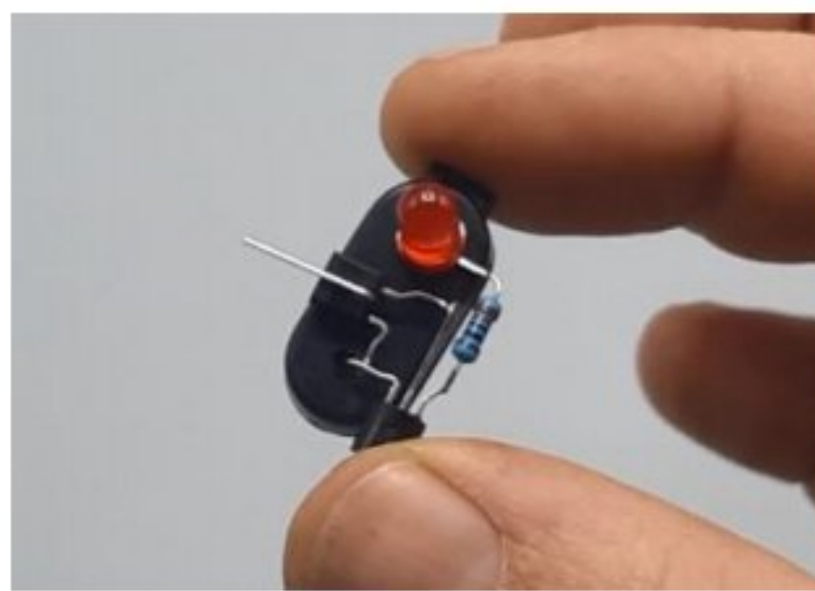
The whole is mounted on the connector in the next step. For this, the connector must first be adjusted a little.

- Cut the wires coming out of the connector.
- Drill 2 small holes of about 2 millimeters through the connector.

### **3) Connect the buzzer**

Connect the Buzzer to the Led it should ring the sound when any object is touch

### **4) Mount the Connector**



- Slide the 2 protruding pins through the connector.
- Solder the pins to the connector.

The pin of the collectors to the + connector, the pin of the cathode of the LED comes to the - connector.



## 5) Install the Spring



A spring is attached to the base connection of transistor 1. This will function as an antenna to receive the electromagnetic induction from the AC circuit.

- Slide the feather over the base and solder the connection.

If you don't have a feather, you can also make a spiral from, for example, a piece of copper wire.

## 6) OUTPUT





## **FUTURE ENHANCEMENT**

- Integration with smart home systems: The Wireless AC Current Detector could be integrated with smart home systems, allowing users to monitor and control their home's power usage from a mobile app or web interface. This could include features such as setting schedules, receiving alerts when power usage exceeds a certain threshold, and remotely turning off devices to conserve energy.
- Real-time data visualization: The Wireless AC Current Detector could be enhanced with real-time data visualization, allowing users to see their power usage in real-time and identify trends and patterns over time. This could help users to better understand their energy consumption and identify areas where they could reduce their energy usage.
- Cloud integration: The Wireless AC Current Detector could be enhanced with cloud integration, allowing users to store and access their power usage data from anywhere in the world.



## REFERENCE/BIBLIOGRAPHY

1. Current Measurement Techniques," by A. Rodriguez, A. Yegin, and H. Tenhunen, in Handbook of Power Systems Engineering with Power Electronics Applications, 2018.

- <https://youtu.be/J8cmaqXSDp8>
- [ChatGPT | OpenAI](#)
- <https://www.instructables.com/Wireless-AC-Current-Detector/>