

## **Objectives:**

1. To learn how to design and build a simple IR receiver circuit.
2. To observe and analyze the behavior of the circuit in response to IR signals.
3. To understand the working principle and characteristics of a transistor and its application in the designed circuit.

## **Introduction:**

Infrared remote sensor is a basic electronic component nearly used in all types of appliances whether it is a domestic or a professional device. These sensors work on the principle of light emitting or detecting infrared radiations. When a signal is passed from the electronic device, the sensors will detect the radiation in its limited area of network and makes the device to be turned on or off. Infrared sensors are used extensively in various applications because of its wide range of applications. Infrared signals detect the light emitted from the source signal to be detected and works on the principle of radiation.

Infrared (IR) remote controls are widely used in various electronic devices such as TV, DVD player, and air conditioners. Testing an IR remote control requires a simple circuit that detects IR signals and provides a visible indication. This project involves designing an IR remote tester using a PNP transistor, an LED, and a few passive components. When an IR signal is received, the circuit allows current to flow, turning on an LED, indicating the presence of an IR signal.

## **Working of Remote Control Circuit:**

The IR receiver (photodiode or phototransistor) is sensitive to infrared

light emitted by the remote control. When an IR signal is received, it generates a small current. The signal from the IR receiver need to be amplified to drive other components. This can be achieved using a transistor or an operational amplifier. The amplified signal is used to drive an LED, which lights up when an IR signal is detected.

When an IR remote control is pointed at the IR receiver (D1) and a button is pressed, the IR receiver detects the modulated IR signal. This signal is then amplified by the transistor (T1) and processed by the op-amp (U3). The output can be observed using an LED or a buzzer to indicate the reception of an IR signal.

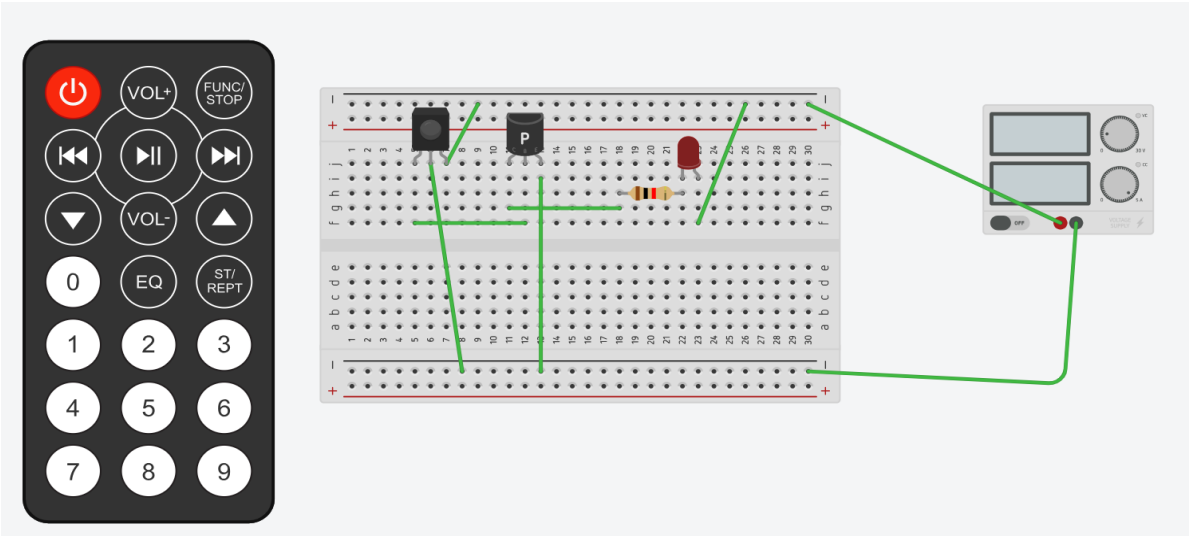
**Apparatus required:**

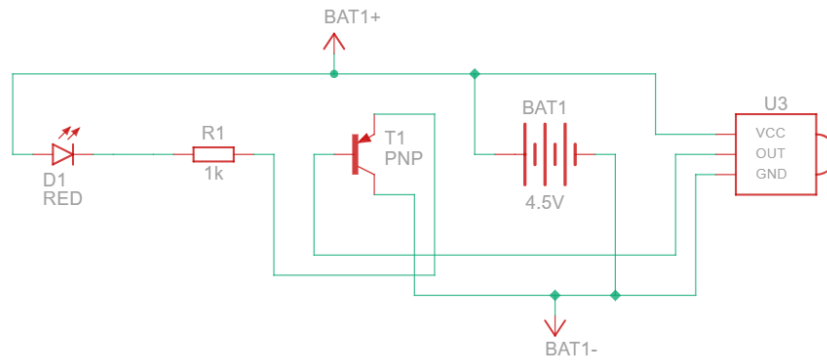
**Title: Components Required for Remote control Circuit.**

Serial no	Name of apparatus	Rating	Quantity
01	DC voltage source	(0-5)v,5A	01
02	Transistor	BC557,Package TO-92, $V_{CE}=5v$ , $V_{BE}=6v$ , $I_c=100mA$ , $P=0.5w$	01
03	Resistor	1k ohm	01

04	LED		01
06	Bread board	5V,1A / 15V,0.33A	01
08	Connecting wires & probes		As Required

**Circuit Diagram and Connections for Remote Control Circuit:**





**Fig: Circuit diagram for Remote Control Circuit**

### **Discussion:**

The construction of the IR remote control circuit involves assembling the components as per the circuit diagram. Care must be taken to ensure proper connections, especially with the polarity of the IR receiver and the transistor. The circuit is powered by a 5V battery, which provides sufficient voltage for the components to operate effectively. During testing, the IR remote control is used to send signals to the tester. The successful detection of these signals confirms the functionality of both the remote control and the tester. Any issues in signal detection can be troubleshooted by checking the connections and ensuring that the components are correctly oriented and functioning. This project successfully demonstrated the basic principles of IR communication and provided hands-on experience in designing and building a simple IR receiver circuit. Through this project, we learned about the importance of component selection, circuit assembly, and troubleshooting techniques. Further improvements to this project could include incorporating a microcontroller to decode the IR signals and display information on an LCD or transmit the data to a computer.

## **Conclusion:**

The IR remote control circuit is a practical and cost-effective way to verify the functionality of remote controls. By using basic electronic components such as a transistor, resistor, and LED, the circuit successfully detects IR pulses. This project helps in understanding fundamental transistor switching principles and IR detection techniques, which can be extended to other remote-controlled applications.

## **Reference:**

**1.**<https://www.elprocus.com/ir-remote-control-basics-operation-application/>