

# Electronics Devices and Circuits Lab

Project report on  
***Mobile Phone detector***

Submitted by-

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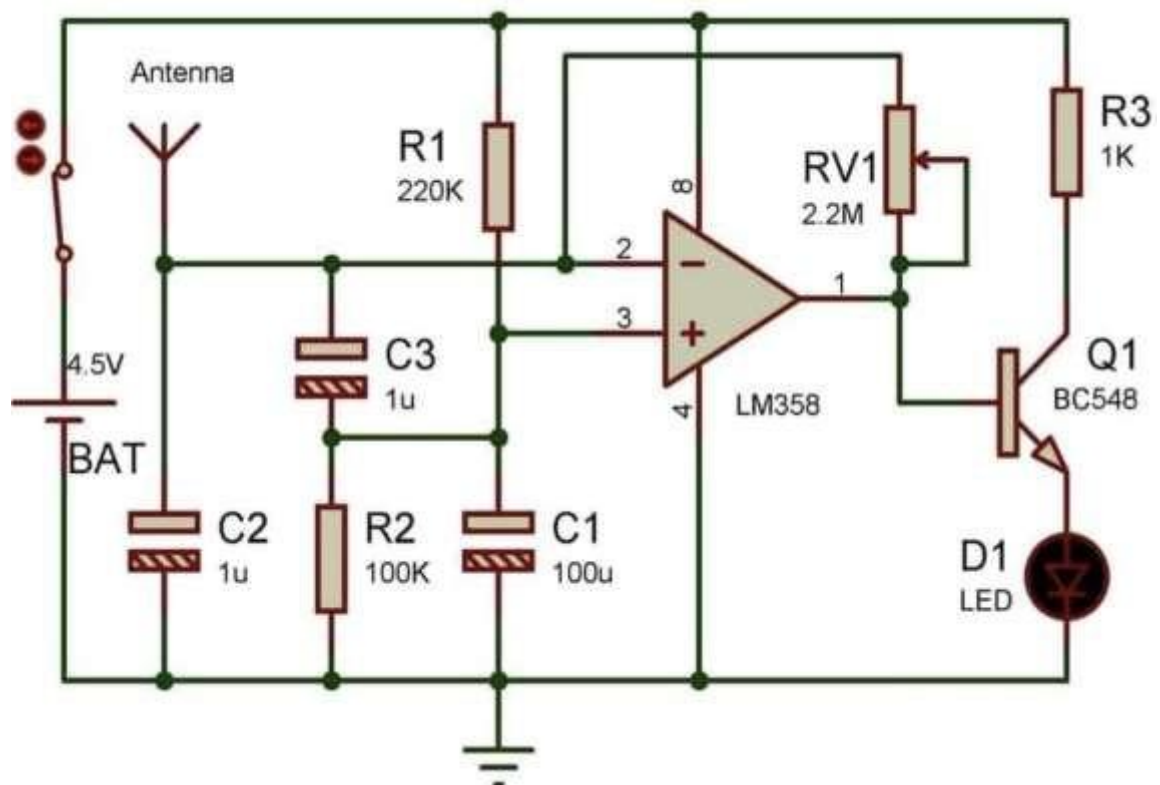
- **Aim-**

To make a circuit that detects the phone when an incoming call or outgoing call is made or when an SMS is sent or received using **LM358 Op-Amp IC** and **NPN Transistor BC548**

- **Components Required**

1. LM358- Dual OpAmpIC
2. BC548- NPN Transistor
3. Resistor- 1 k $\Omega$ , 100 k $\Omega$ , 220 k $\Omega$
4. Potentiometer-1 M $\Omega$ \* 2
5. Capacitor- 1  $\mu$ F, 100  $\mu$ F, 2.2  $\mu$ F
6. LED
7. Antenna
8. Power supply- 9V Battery
9. IC 7508 (To convert 9V to 5V)

□ **Circuit Diagram-**

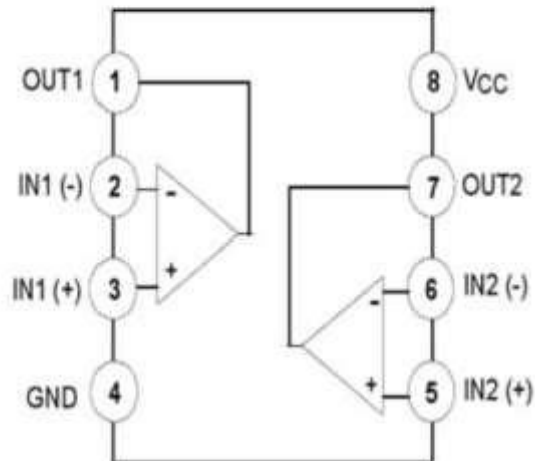


## □ Theory-

### 1) LM358 Op-Amp IC –

LM358 IC is a dual operational amplifier integrated circuit with two Op-Amp powered by a common power supply. It consists of two independent compensated operational amplifiers with low power and high gain frequency.

In LM358, Pin 8 is the main power supply input. LM358 contains two operation amplifiers (A&B as in the pin diagram) where the input of the first amplifier (A) is pin 2 and pin 3 and the output is pin 1. If we want to use the second amplifier (B), then the input for this amplifier is at pins 5 and 6 and the output is at pin 7.



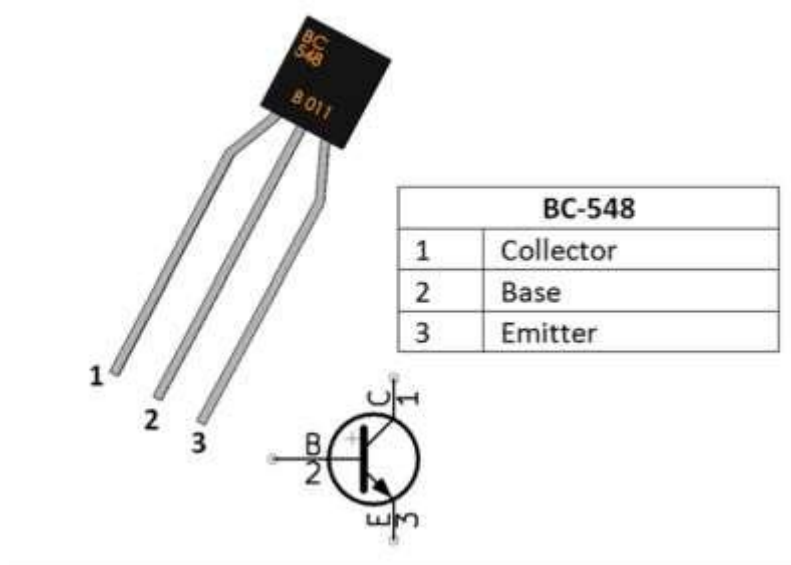
**Pin Diagram of LM358 Op-Amp IC**

## 2) NPN Transistor BC548 -

BC548 is a NPN transistor so the collector and emitter will be left open (Reverse biased) when the base pin is held at ground and will be closed (Forward biased) when a signal is provided to base pin. BC548 has a gain value of 110 to 800, this value determines the amplification capacity of the transistor.

NPN Transistor BC548 is used in Mobile phone detector mainly for two reasons-

1)- **Additional Amplification:** The LM358 is a great operational amplifier, but for very weak signals, like those picked up by an antenna detecting an active mobile phone, it might need some extra amplification. The BJT can be configured as a pre-amplifier stage, boosting the weak RF signal before it enters the LM358 for further processing. 2)- **Signal Filtering:** BJTs can also be used to create a bandpass filter effect. This can be helpful in a mobile phone detector circuit because it can help to isolate the specific range of radio frequencies (RF) emitted by mobile phones and reduce noise from other sources.



**BC548 Transistor Pinout**

This circuit consists of an op-amp with some active-passive components. A LED is used for an indication of the presence of a cellphone. Op-amp is configured as Frequency Detector and its output is connected to a LED using NPN Transistor.

This circuit is built using LM358 op-amp IC which is a dual op- amp IC, which means it contains two independent operational amplifiers in a single package. This circuit also contains NPN Transistor BC548 which is a general-purpose NPN bipolar junction transistor (BJT) that is commonly used in electronic circuits for amplification and switching purposes.

When a mobile phone is active, it radiates RF signal in the form of electromagnetic radiation. When the mobile phone radiates energy in the form of RF signal, Capacitor C2 absorbs it and used as an input to LM358 IC. The output of LM358 is connected to LED via Transistor which gets turned ON. Then the flashing of LED is observed. The potentiometer RV1 is used to adjust the sensitivity or range of the circuit.

## **. Applications-**

1. The circuit can be utilized to detect phones in the examination halls, conference rooms, etc.
2. It can be adopted for military purposes.
3. It can also be employed in phone tracking systems.
4. It is useful where the use of mobile phone is prohibited.

- **Limitations-**

1. It detects signals from mobile from a very short range (a few Centimetres) and sometimes it fails to detect mobile signals from a larger range.
2. Antenna detects frequency from a broader range, hence sometimes LED blinks even in the absence of a Mobile phone