MANJARA CHARITABLE TRUST
RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI
Department of Instrumentation engineering

University of Mumbai

2017

SUBJECT: - SIGNAL CONDITIONING CIRCUIT DESIGN

A MINI – PROJECT

ON

MOBILE PHONE DETECTOR

Submitted by

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Under the guidance of

Internal guide

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External Examiner

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Acknowledgement

We take this opportunity to express our sincere gratitude towards all those who helped in creating this report. It was possible because of the opportunity which our Prof. Pramod Gawande gave us to make a report on the topic '**Mobile Phone Detector IC 555'**. It was a pleasure working on the report. It helped us to co-ordinate and co-operate with our batch mates and taught us the important skill of teamwork. The research carried out on this topic helped us to understand the fundamentals of signal conditioning and design of a circuit. This has contributed to our knowledge

The contents of this report were created with reference materials provided by our college's library. They have played a vital role in this report

Last but not the least, we are thankful to all our project members for their continuous efforts in making our project successful.

VARAD GAONKAR

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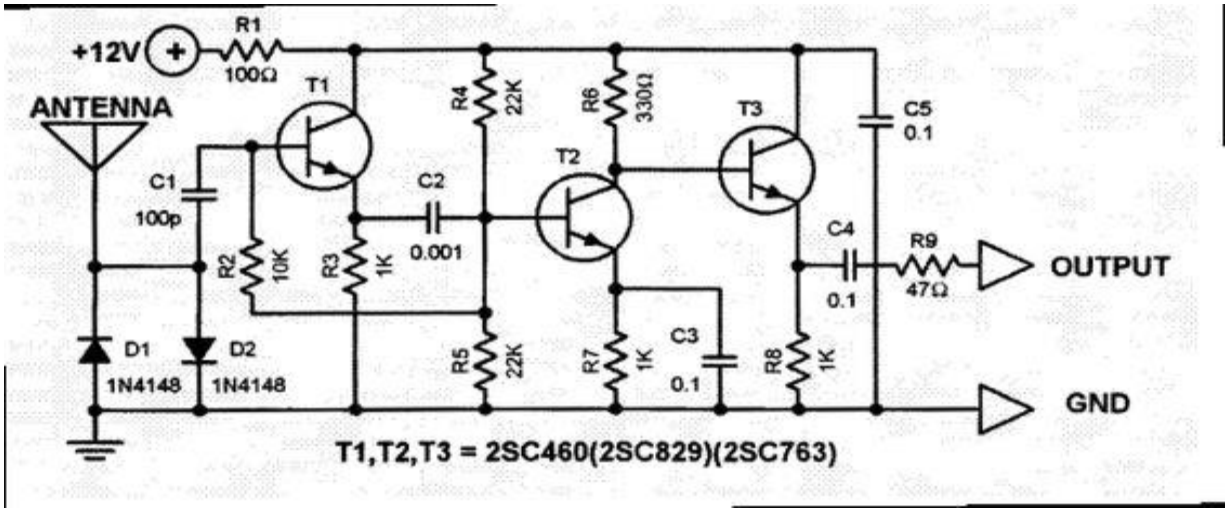
Introduction

This mobile phone detector can sense the presence of an activated mobile phone from a distance of four to five meters. So it can come handy in examination hall or meetings where mobile phones are not permitted.

The circuit can detect incoming and outgoing calls, SMSes, Internet and video transmissions even if a mobile phone is kept in silent mode. When it detects an RF signal from an activated mobile phone, it's LED starts blinking and continues to blink until the signal stops.



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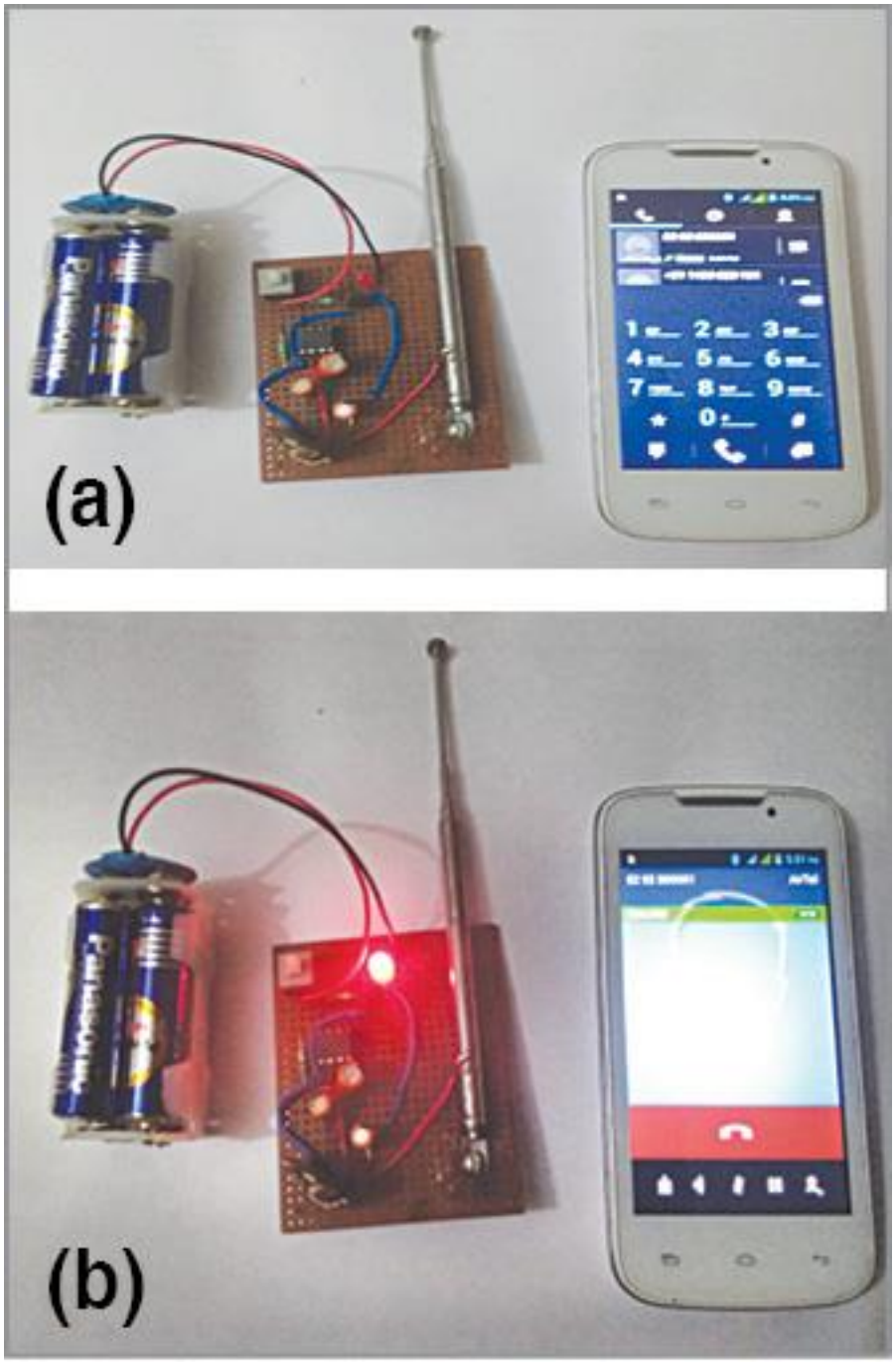
(a)
(b)

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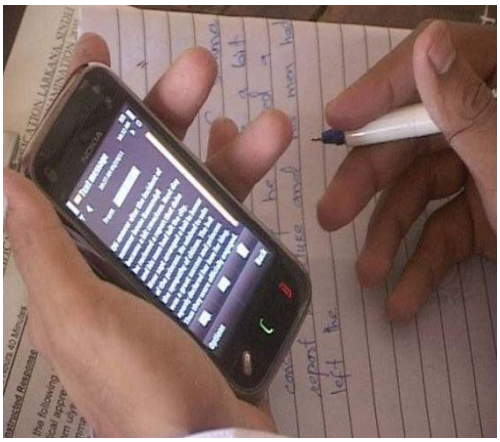
Concept

When at a given place where cell phones are not permitted. There we can use a mobile phone detector which is a compact and easy to use device which can be used to detect RF signals emitted from mobile phones and can be brought to notice. It can be used at high profile exams or in various entrance test exams were chances of using mobile phone in restricted areas is more or in important meetings where mobile phones are not allowed. Also the signals emitted by phones can cause various problems in areas such as airplanes where the signal might get mix with the important signals coming from air control room and it might cause disaster.



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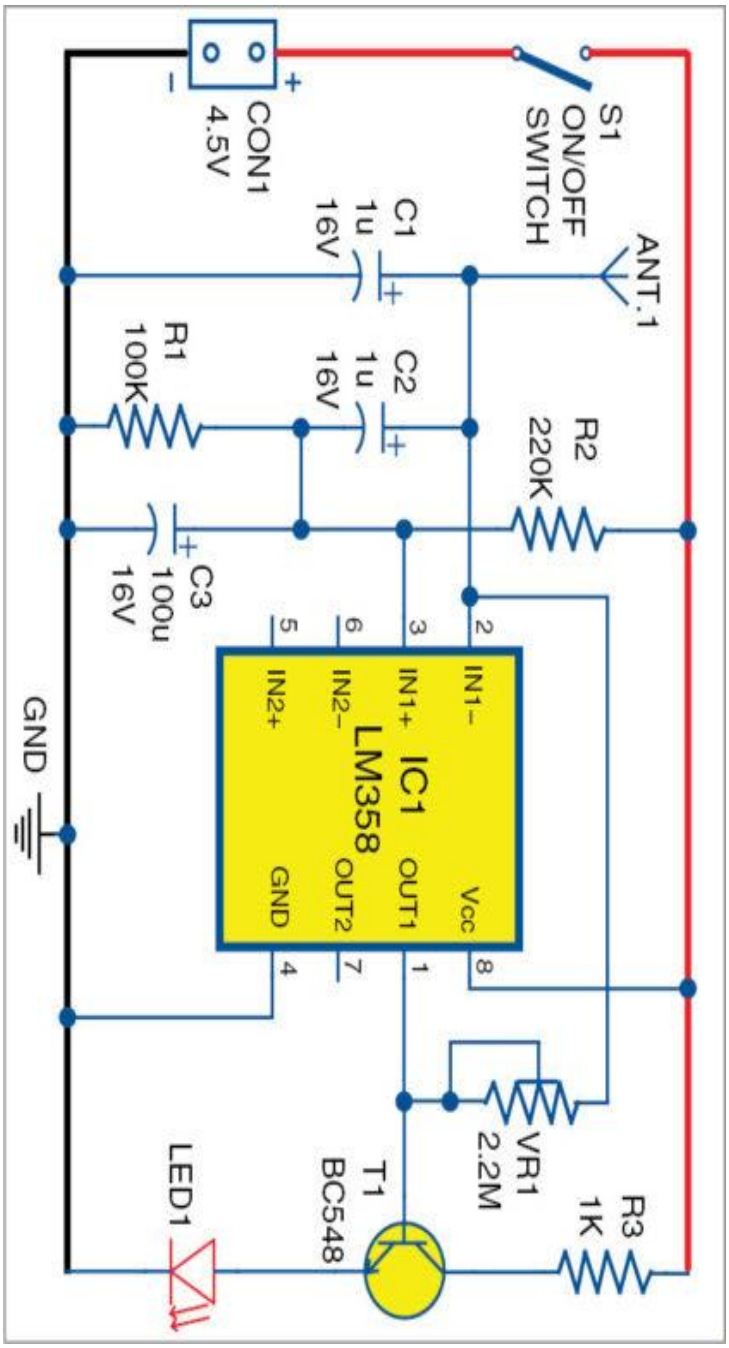
Circuit Diagram



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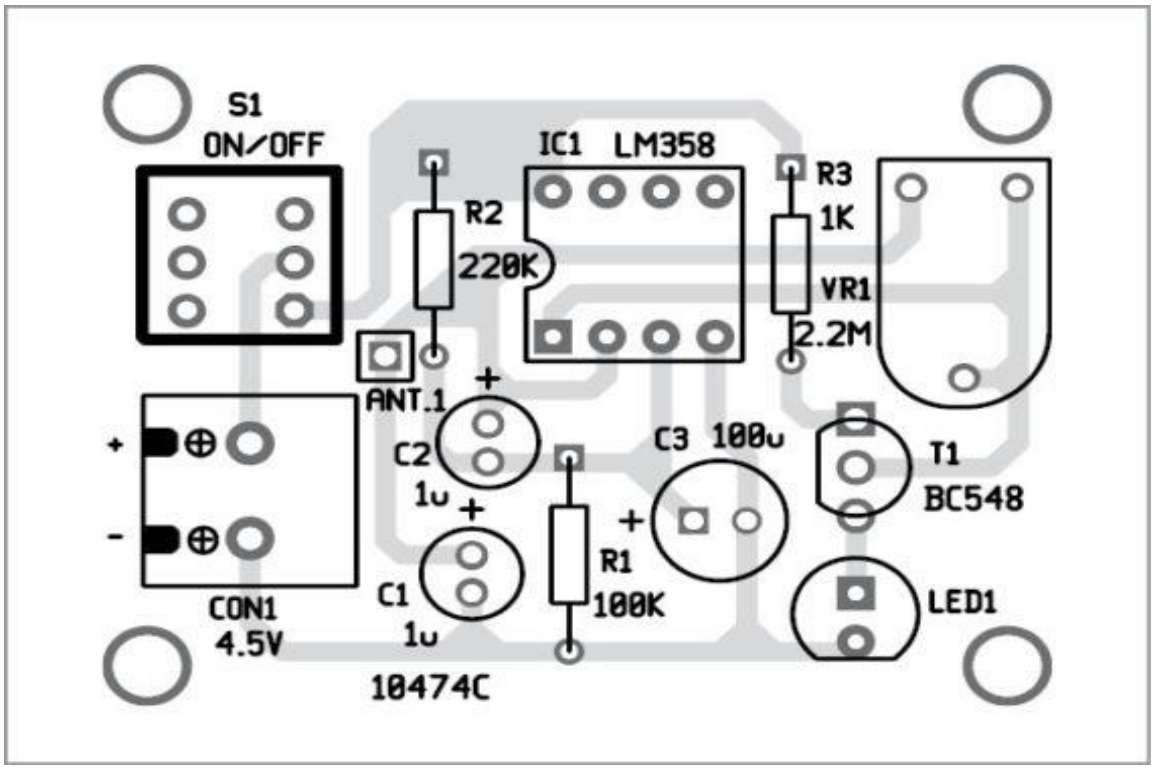
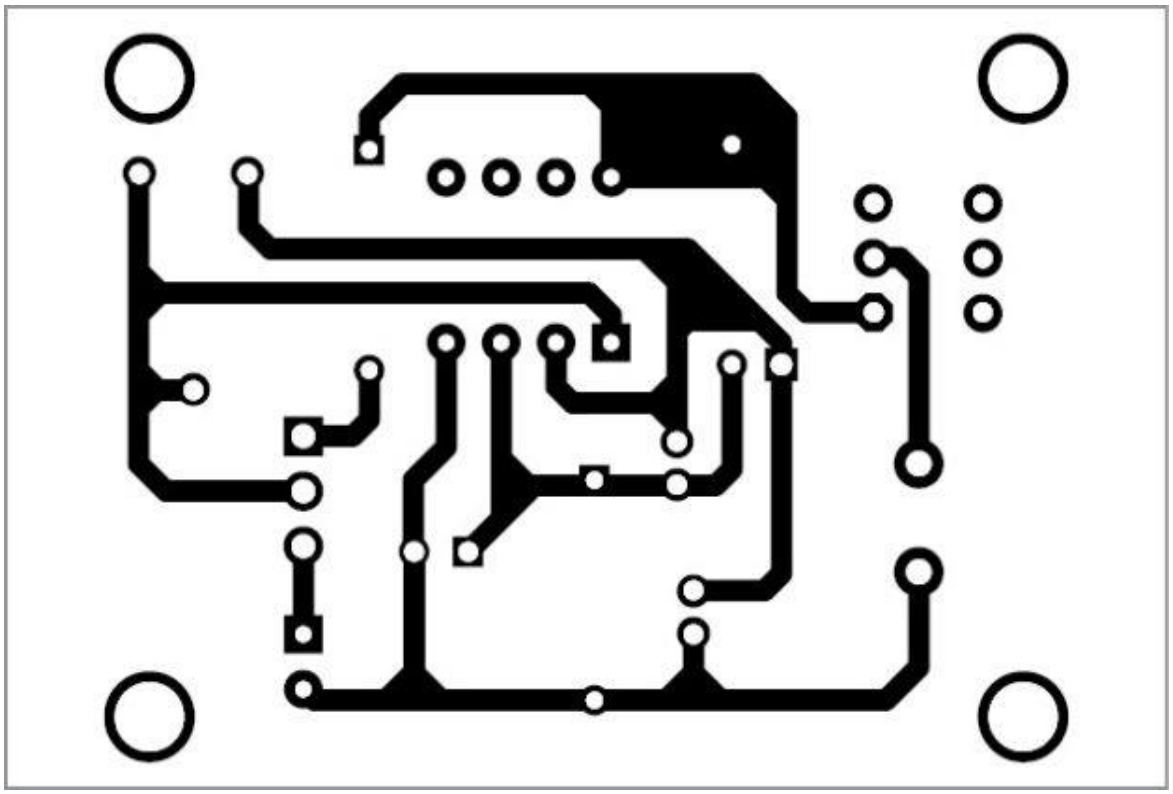

S1
ON/OFF
IC1 LM358
R2
220K
R3
1K
VR1
2.2M
ANT.1
C2
1u
C3 100u
T1
BC548
R1
100K
CON1
4.5V
C1
1u
LED1
10474C



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Designing

Following is the Hardware specification of the circuit design:-

Semiconductors	
IC1	LM358 op-amp
T1	BC548 npn transistor
LED1	5mm LED
Resistors (all ¼ watt, ±5% carbon)	
R1	100 k Ω
R2	220 k Ω
R3	1 k Ω
VR1	2.2 m Ω preset
Capacitors	
C1	1 µF 16V electrolytic
C2	1 µF 16V electrolytic
C3	100 µF, 16V electrolytic
Miscellaneous	
CON1	2 pin terminal connector
S1	ON/OFF switch
ANT.1	15 cm single-strand wire antenna
Supply	4.5V D.C power supply

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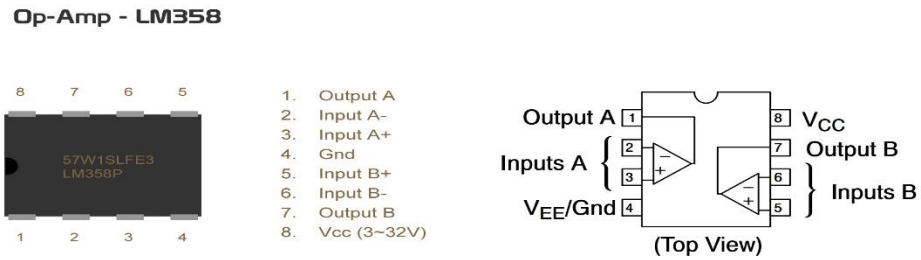
➢ **Integrated circuits: - IC** (Integrated Circuit) indicates that all components in each circuit are fabricated on the same chip. They have become a vital part of modern electronic circuit design and used in computer industry, automobile industry, home appliances, communication and control systems. It was designed to provide long trouble free services .Because of its predesigned packaging, it requires only a power supply followed by an input and output. The LM358 is a low power dual operational amplifier integrated circuit originally introduced by National Semiconductor. It is used in detector circuits

➢ **LM 358:-** The abbreviation LM358 indicates an 8-pin integrated circuit, comprising two operational amplifiers at low power. The LM358 is designed for general use as amplifiers, high-pass filters, low band pass filters, and analog adders.



LM 358 Pin Layout

The LM358 IC is a great, low power and easy to use dual channel op-amp IC. It is designed and introduced by national semiconductor. It consists of two internally frequency compensated, high gain, and independent op-amps. This IC is designed for specially to operate from a single power supply over a wide range of voltages. The LM358 IC is available in a chip sized package

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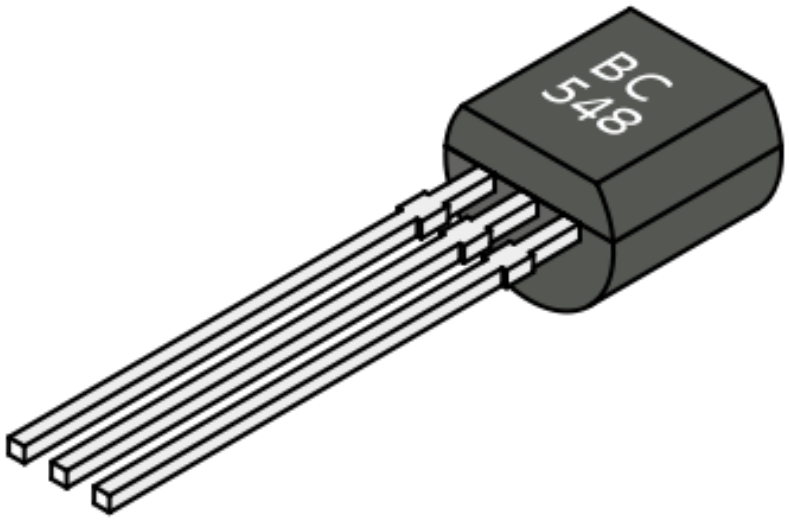
and applications of this op amp include conventional op-amp circuits, DC gain blocks and transducer amplifiers. LM358 IC is a good, standard operational amplifier and it is suitable for your needs. It can handle 3-32V DC supply & source up to 20mA per channel. This op-amp is apt, if you want to operate two separate op-amps for a single power supply. It's available in an 8-pin DIP package

- ***BC548 npn transistor: -*** The BC548 is a general-purpose NPN bipolar junction transistor commonly used in European and American electronic equipment. It is notably often the first type of bipolar transistor hobbyists encounter, and is often featured in designs in hobby electronics magazines where a general-purpose transistor is required. The BC548 is low in cost and widely available.



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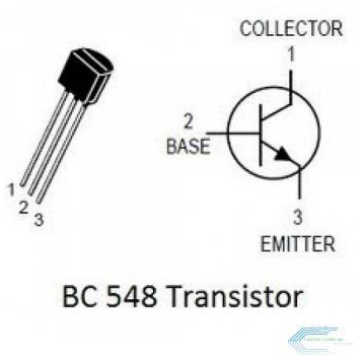
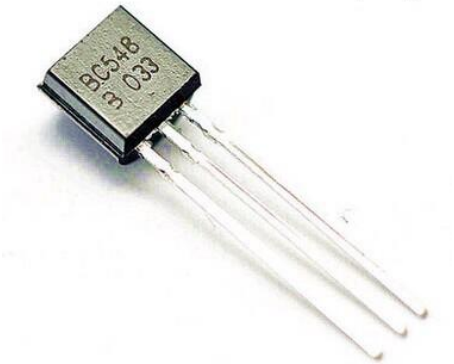


BC 548 Transistor

The BC548 is a part of a higher-quality family of NPN and PNP silicon transistors that originated with the metal-cased BC108 family of transistors. This series, introduced in 1966 by Philips, became the most used transistors in Australia and was taken up by many European manufacturers. The BC548 is the modern plastic-packaged BC108, BC548 is described as a successor to the BC238 and differing from the BC108 in only the shape of the package. Datasheets for the BC548 give specifications that are identical to, or exceed, those of the BC108, BC148 and BC238 predecessors. Thus the BC548 (or BC546 to 550) is a valid substitute in any circuit designed for older BC108 (or BC148), which includes many Mullard and Philips published designs.



the BC548 is principally produced by ON Semiconductor and Fairchild Semiconductor.

- **LED**: - A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.[5]When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 mm2) and integrated optical components may be used to shape the radiation pattern

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➢ **Resistor: -** A resistor is a passive two-terminal electrical component that

implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses

Here we are using 100 k Ω, 220 k Ω,
1 k Ω and 2.2 m Ω resistors.

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➢ **Capacitor** :- A capacitor is a passive two-terminal electrical component that stores electrical energy in an electric field. The effect of a capacitor is known as capacitance. Two 1 µF 16V electrolytic capacitor and one 100 µF 16V electrolytic capacitor is used.

Capacitors – Electrolytic Ceramic

➢ **Miscellaneous** :- The rest components are mentioned below :-

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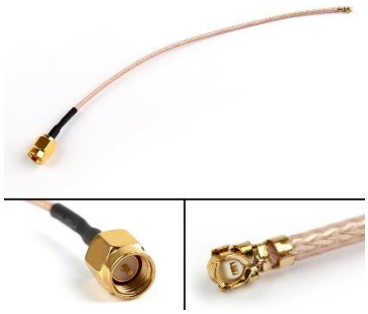
2 Pin Terminal Connector

On-Off Switch



15 cm single-strand wire antenna

4.5 Volt Battery

Implementation

When a mobile phone is active, it radiates RF signal that passes through nearby space. The signal contains electromagnetic RF radiation from the phone.

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Capacitor C1 is used in the circuit to detect the RF signal from the mobile phone. When the mobile phone radiates energy in the form of RF signal, C1 absorbs it and passes on to the inputs of IC1. This is indicated by the flashing of LED1. Preset VR1 (2.2M) is used to vary the range of the circuit. Transistor T1 is used to amplify the signal obtained at pin 1 of IC1. The circuit is applicable for 2G networks, GPRS and network search (manual/automatic). It does not detect 3G, WCDMA and HSDPA network signals so well.

Results and Conclusion

This concept will help at present and in future to detect mobile Mobile Phone Detector is essential in examination cells and cell phone restricted places. Having Mobile Phone Detector has its own advantage. Mobile Phone Detector is an embedded system which will be useful for detection of mobile phones in mobile phone restricted areas.

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Future Scope

This pocket-size mobile transmission detector or sniffer can sense the presence of an activated mobile cell phone from a distance of one and-a-half meters. So it can be used to prevent use of mobile phones in examination halls, confidential rooms, etc. It is also useful for detecting the use of mobile phone for spying and unauthorized video transmission

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6. **http://www.ti.com/lit/ds/symlink/ne555.pdf**
7. **http://file.scirp.org/pdf/IJCNS_20140424043746 87.pdf**