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Cell Phone Detector

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ABSTRACT –

Cell phones are broadly utilized within the world. Whereas individuals need to be associated to one another, there are circumstances or places where their utilization is to be disallowed either due to security reasons or it may cause wellbeing risks. These anticipated preferences, be that as it may, would have potential undesirable impacts on the off chance that mobile-phones are utilized in confined premises, such as exam scenes.

Cell phone discovery has been on examination for a long time. There are procedures which have been defined or proposed on how cell phones can be identified. Most of them utilize the highlights such as sound framework, RF framework and common materials of the phones and attempt to see into how they can be utilized as premise to distinguish versatile phones. This venture utilizes the RF framework of the cell phone as the highlight to be utilized to distinguish its nearness. A circuit that recognizes signals of the extend 0.9GHz to 3GHz is utilized to distinguish a cell phone when in utilize. When the flag is recognized, an Driven squints to show the utilization of a cell phone inside a span of 1.5 meters.

Keywords: Investigation, detection, cell phone, LED

I. INTRODUCTION

Cell phones have gotten to be an fundamentally portion of people's lives. They are not as it were utilized for communication by means of brief informing benefit (SMS), calls, emails and web but progressed applications such as farther wellbeing observing frameworks and security frameworks have been coordinates with versatile phones.

It is subsequently versatile utilization in a few places must be disallowed. Due to the security laws that constrain the utilize of cell phone jammers, cell phone finders must be outlined and introduced so that in case a individual gets in with a phone into such places, they can be informed and either told to switch them off or take them exterior. The adequacy of cell phone finders is that they ceaselessly check for the nearness and utilization of the cell phone and sound an alert to inform the client.

This versatile locator circuit recognizes the portable phones at moo separations. The frequencies which are radiated by portable phones are recognized by this circuit. This circuit recognizes portable frequencies up to 0.9 GHz to 3 GHz.

II. LITERATURE REVIEW

The research done by Dr. P. D.Sangeetha and K.S.Gowthaman presents the design and development of a digital signal detector capable of detecting incoming and outgoing signals from mobile phones. The pocket size device can detect an activated mobile phone from a distance of one and a half meters. It is useful for preventing mobile phone use in examination halls, confidential rooms, and detecting unauthorized video transmission. The circuit employs a combination of RF signal detection and audio sensing to identify mobile phone activity. By analyzing the frequency bands used by mobile phones, it provides reliable detection even when phones are in silent mode. [1]

The research paper by C. C. Mbaocha investigates detection techniques for cell phones. It explores using the phone's audio system, RF system, and other common elements as a basis for detecting mobile phones. The research delves into machine learning algorithms for identifying unique patterns in mobile phone signals. By analyzing signal strength, frequency, and modulation, the system achieves accurate detection even in noisy

environments. These authors have made significant contributions to the field, addressing practical challenges and advancing our understanding of cell phone detection technologies. [2]

The paper by P. Pathology proposes two systems for detecting mobile phones in exam venues: A mobile detector with a range of 1.0 meter, using a resistor-capacitor circuit. It can detect incoming and outgoing calls, video transmission, and text messages, even if the mobile phone is in silent mode. A Reed-switch circuit scanner that responds to applied magnetic fields. It detects switched-off or flight-mode mobile phones, allowing non-invasive scanning of students entering examination rooms. The Reed-switch scanner is particularly useful for ensuring compliance during high-stakes exams, where mobile phone usage is strictly prohibited. [3]

III. METHODOLOGY

In general, methodology is the study of research methods and ways of implementation. There are two methodologies that is two ways to design and implement the circuit of cell phone detector based on components.

1. Op-Amp-Based Cell Phone Detector :

The Op-amp acts as the RF signal detector. Capacitors and the antenna detect RF signals when a cell phone makes or receives a call or text message. Op-amp converts the rise in current at the input to voltage at the output, activating the LED.

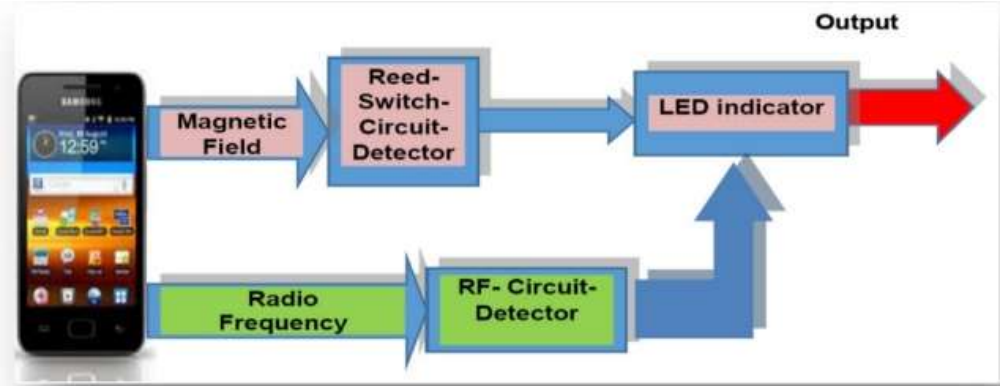

Fig. 1: Methods for cell phone detection

2. Schottky Diode-Based Cell Phone Detector:

The inductor captures RF signals. Schottky diode rectifies low-frequency AC signals. Filter capacitor smooths the rectified signal. The transistor amplifies the signal for further processing.

We have decided to use 1st method due to availability of components and it is also easier. There are also other methods to design and implements cell phone detector circuit.

IV. WORKING

BLOCK DIAGRAM –

The cell phone detector consists of three main components including Antenna, OP-Amp and LED. The basic block diagram of cell phone detector is as shown below in fig. 2,

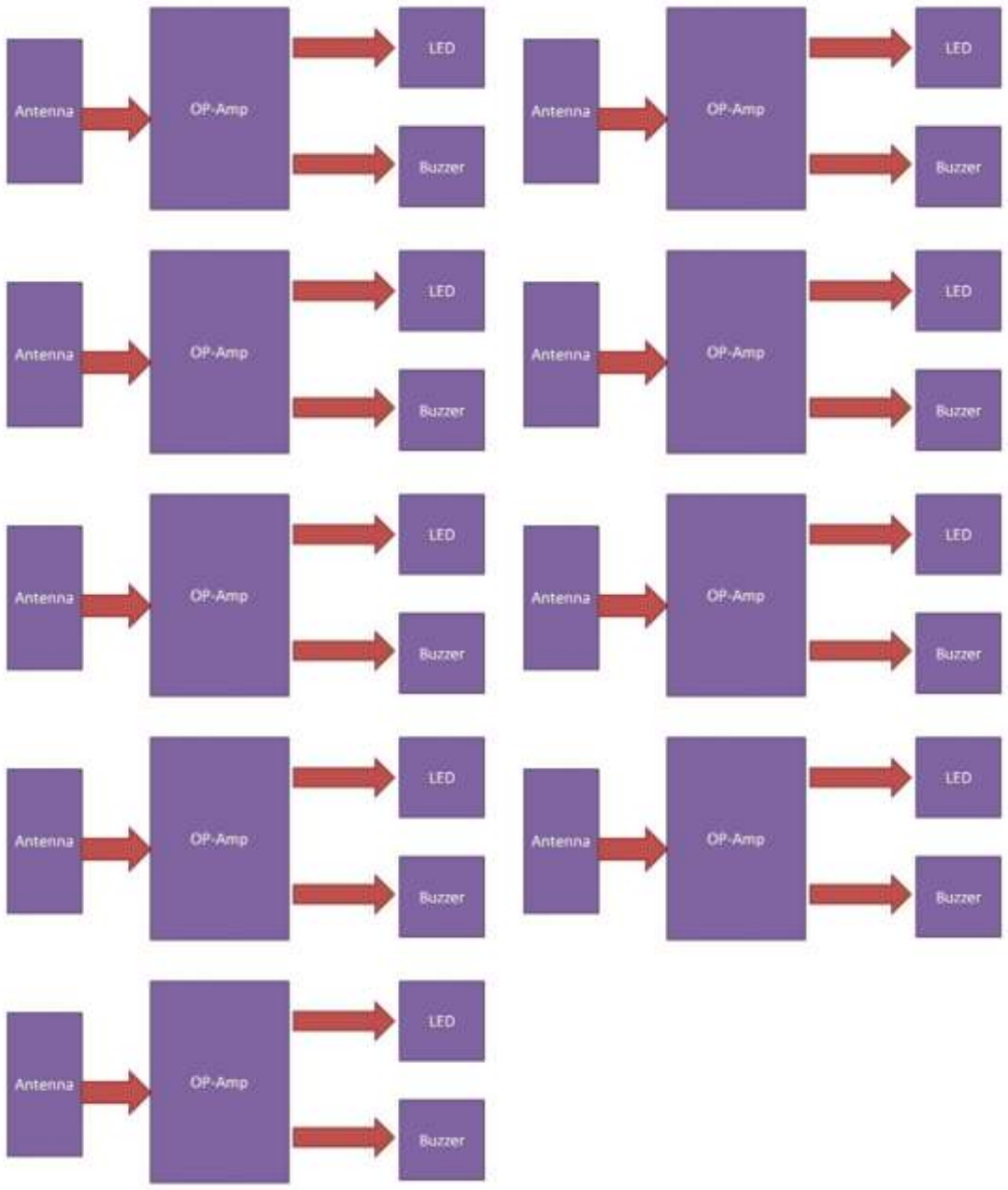

Fig. 2: Block diagram for cell phone detector

The antenna is the initial point of contact for radio signals. The antenna captures the radio frequency signals generated by an active cell phone in its range. And sends electrical signal towards op-amp. An op-amp is used with some active and passive components. The op-amp's function is to increase the strength of the signals so they can be analyzed. A LED or buzzer are used for indication of presence of cellphone. The amplifier's job is to increase the strength of the signals so they can be analyzed.

CIRCUIT DIAGRAM –

The circuit diagram of cell phone detector circuit is as shown in fig. 3, which shows all components and connections between them.

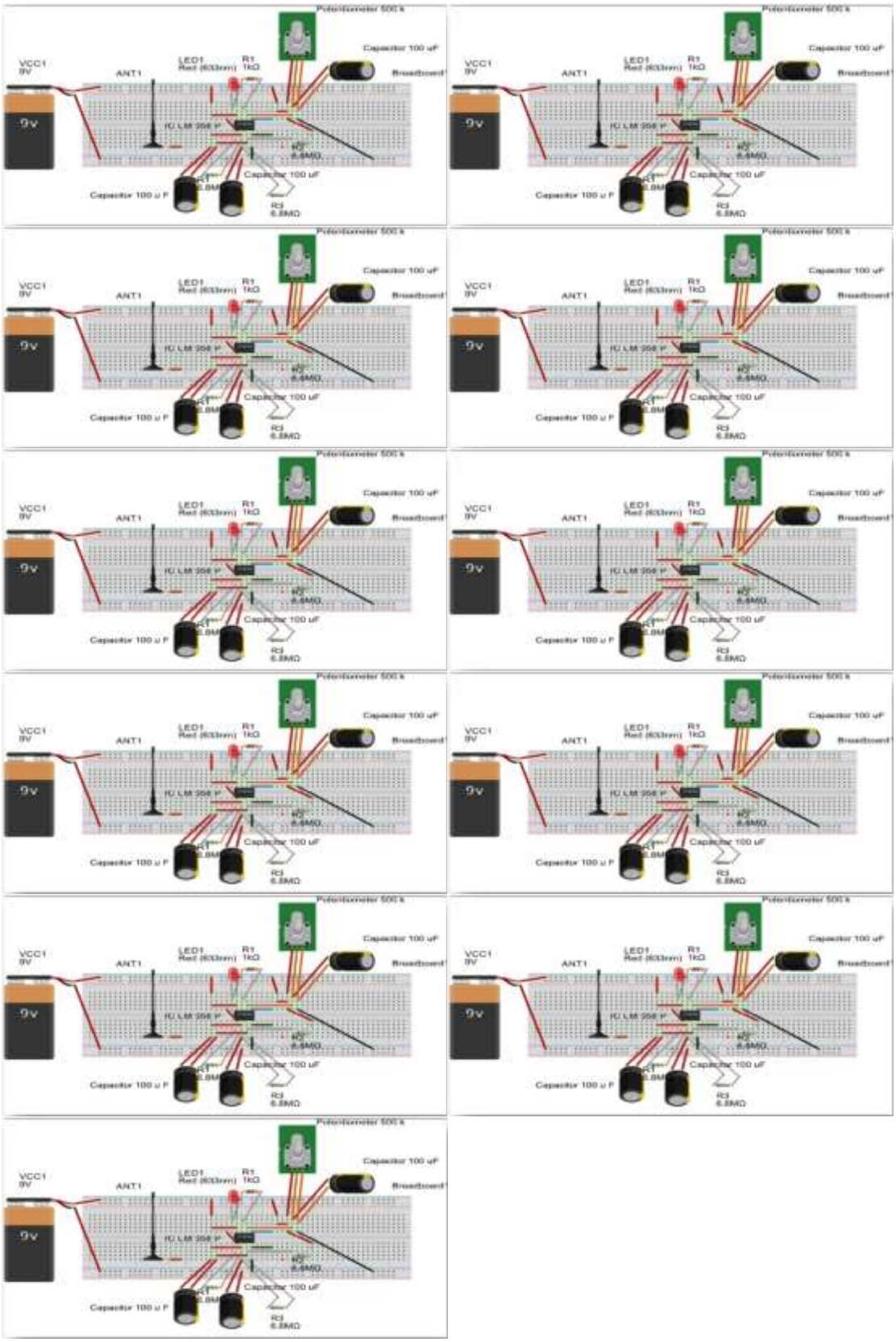

Fig. 3: Circuit diagram for cell phone detector

Working :

As shown in fig. 3, the antenna is used to detect the RF signal from the mobile phone if any signal is transmitted or received. A capacitor has two electrodes that can store energy and pass AC-signals. The 100uF capacitor is selected because it is a low-cost and has large enough capacity to accept energy from the mobile phone radiation. There is a electromagnetic field around the capacitor caused by the 90Hz from electrical wiring. The RF signal from the phone will disturb the field and forces the capacitor to release energy this is applied to the op-amp through forward biased diode. The output of the LM358 is applied to transistor through high value of resistor. The LED and buzzer has been driven by the transistor. The battery supply is applied to the supply of the op-amp. The transmission and receiving signals are captured by the antenna the LED will glow and Buzzer make a sound.

V. COMPONENTS USED

Following components are used for designing cell phone detector circuit :

(i) IC LM358 - LM358 is a dual op-amp IC integrated with two op-amps powered by a common power supply. It can be considered as one half of LM324 op-amp which contains four op-amps with common power supply.

(ii) Transistor - The BC548 is a common NPN bipolar junction transistor used for power amplifying and switching applications. It is designed for low current and power, medium voltage, and can operate at moderately high speeds.

(iii) Resistor – The 1 KΩ, 100 KΩ, 220 KΩ and 2.2 MΩ resistors are used which provides opposition to overloading.

(iv) Capacitor - Here we use 1µf and 100 µf capacitors. It is the electrolytic capacitor, used to filter out DC ripples. It provides a high level capacity coupled with a smaller size at low price as compared with other lower value capacitor.

(v) LED - A light emitting diode is a semiconductor diode that emits light when current is passed through that diode. Light is produced when the particles that carry the current is combine together in the semiconductor material.

(vi) Antenna – A 15 cm single stand wire antenna is used in this circuit which is at low price as compared with other antennas.

(vii) Power Supply – A 4.5 V battery is used as a power supply in the circuit. In the two electrode one acts as cathode which is the positive end of battery where the current leaves during discharge and another end acts as anode which is the negative side where the current enters during discharge.

VI. CONCLUSION

The cell phone detector project is a practical application of electronics that can detect active cell phones in a certain range. It is a testament to the practical application of electronics and RF signal detection. Despite its limitations, such as the inability to differentiate between RF signals from different devices, it provides a valuable learning experience. This project has potential applications in various fields where cell phone usage is restricted or dangerous, such as examination halls, meeting rooms, petrol pumps, or hospitals. The project also serves as a stepping stone for students and hobbyists to delve deeper into the world of electronics and communication. Overall, it's a practical, educational, and potentially impactful electronics project.

VII. REFERENCES

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