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HIDDEN ACTIVE CELL PHONE DETECTOR

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ABSTRACT

As increase in the technology in the world using the electronic equipment are being used in a wrong way like, in the examination halls and confidential rooms. To avoid this we are introducing a project called hidden active cell phone detector. This handy, 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. The circuit can detect the incoming and outgoing calls, SMS and video transmission even if the mobile phone is kept in the silent mode. The moment the Bug detects RF transmission signal from an activated mobile phone, it starts sounding a big alarm and the LED blinks. The alarm continues until the signal transmission cases. Assemble the circuit on a general purpose PCB as compact as possible and enclose in a small box.

Keywords-Intelligent detector, GSM signal, Cell phone, restricted areas

INTRODUCTION

In recent years, there has been increasing focus on issues relating to the use of mobile phones in restricted, prohibited, and unauthorized areas. The reason for this increased interest in largely due to disturbance, as well as wrong and inappropriate uses of mobile phones by the owners and users alike. Other areas like churches, offices, and prisons, just to mention a few, are not left out. There is need for the detection of mobile phone signals in areas like these. Efforts have been in place in tackling this issue but they all have their own shortcomings. Mobile phone uses RF with a wavelength of 3.3 to 10 cm at ranges from 0.9 to 3 GHz that is, the signal is high frequency with huge energy. When the mobile phone is active, it transmits the signal in the form of sine wave which passes through the space. The encoded audio or video signal contains electromagnetic radiation which is picked up by the receiver in the base station.

Cellular Phone Technology

Cellular phone technology is changing rapidly. Features like Bluetooth, USB, high resolution cameras,microphones, internet, 802.11 wireless, and memory cards are added every year. Also, the communication technology a cellular phone uses such as CDMA, GSM, 3G and 4G are rapidly changing.

Concept

When a GSM (Global System of Mobile Communication) digital phone is transmitting, the signal is time shared with seven other users. That is at any one second, each of the eight users on the same frequency is allotted 1/8 of the time and signal is reconstituted by the receiver to form the speech. Peak power output of a mobile phone corresponds to 2 watts with an average of 250 mW of continuous power. Each handset with in a 'cell' is allotted a particular frequency for its use. The mobile phones transmits short signals at regular intervals to register its availability to nearest base station. The network data base stores the information transmitted by the mobile phone. If the mobile phone moves from one cell to another, it will

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keep the connection with the base station having strongest transmission. Mobile phone always tries to make connection with the available base station. That is why, the back light of the phone turns on intermittently while travelling. This will cause severe battery drain. So in long journeys, battery will flat within a few hours. AM Radio uses frequencies between 180 KHz and 1.6 MHz, FM Radio uses 88 to 180 MHz, TV uses 470 to 854 MHz Waves at higher frequencies but within the RF region is called Micro Waves. Mobile phones uses high frequency RF wave in the microwave region carrying huge amount electromagnetic energy. Thai is why burning sensation develops in the year if the mobile is used for long periods. Just like a microwave oven, mobile phone is cooking the tissues in the ear. RF radiation from the phone causes oscillation of polar molecules like water in the tissues. This generates heat through friction just like the principle of microwave oven. The strongest radiation from the mobile phone is about 2 Watts which can make connection with a base station located 2 to 3 Km away.

PROPOSED DESIGN

Our proposed model consists of four parts i.e., the capturing RF transmission stage, the current to voltage converter, the trigger stage and the timer stage. The capturing stage consists an antenna can captures all frequencies in the mobile communication spectrum from 0.9 to 3 GHz. The transmission stage consists of a 0.22µF disk capacitor which receives the RF signal from the mobile phones. The current to voltage converting stage consists of IC3130 which converts the current received from the previous stage into the corresponding output voltage. The trigger stage transistors the timer from one state to another state(i.e., from stable to quasi stable state). The timer stage is responsible for period of sounding the buzzer

IC DESCRIPTION

CA3130: CA3130 is op-amp that combine the advantage of both CMOS and bipolar transistors .Gate – protected P channel MOSFET (PMOS) transistors are used in the input circuit to provide very high input impedance , very low input current and exceptional speed performance .The use of PMOS transistors in the input stage results in common mode input voltage capability down to 0.5v below the negative supply terminal ,an important attribute in single supply applications .A CMOS transistor pair capable of swinging the output voltage within 10mv of either supply voltage terminal , is employed as the output circuit. The CA3130 series circuits operate at supply voltages ranging from 5v to 16v . They can be phase compensated with a single external capacitor ,and have terminals for adjustment of offset voltage for applications requiring offset – null capability .

Table1: Pin Details of CA3130

PIN NO.	PIN DESCRIPTION
1	Offset Null
2	Inverting Input
3	Non- inverting input
4	V-
5	Offset Null
6	Output
7	V+
8	NC

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the trigger input falls below the trigger level , the flip-flop is set , and the output goes high If the trigger input is above the threshold level , the flip-flop is reset and output is low . The reset input can override all other inputs and can be used to initiate a new timing cycle . When rest goes low , the flip-flop is reset and the output goes low when the output is low , a low impedance path is provided between discharge and ground .

Table2: Pin Details of NE555

PIN NO.	PIN DESCRIPTION
1	Ground
2	Trigger
3	Output
4	Reset
5	Control voltage
6	Threshold
7	Discharge
8	Power supply

BC548: This is general purpose silicon, NPN, BJT. It is used for amplification and switching purposes. The current gain may vary between 110 and 800. The maximum current gain is 800. BC548 is used in common Emitter configuration for amplifiers.

CIRCUIT DESCRIPTION AND WORKING

The transmission frequency of mobile phones ranges from 0.9 to 3 GHz with a wavelength of 3.3 to 10 cm. so, a circuit detecting gigahertz signals is required for a mobile bug. Here the circuit uses a 0.22µF disk capacitor (C3) to capture the RF signals from the mobile phone. The lead length of the capacitor is fixed as 18mm with a spacing of 8 mm between NE555: The NE 555 operates over a range of (0-70) degree C

.The important features of the 555 timer are :it operates from a wide range of power supplies(+5V to +18V).These devices are precision timing circuits capable of producing accurate time delay or oscillation . In the time delay or mono-stable mode of operation , the timed interval is controlled by a single external the leads to get the desired frequency. The disk capacitor along with the leads acts as a small gigahertz loop antenna to collect the RF signals from the mobile phones. This system comprises the capturing RF transmission stage, the current to voltage converter, the trigger stage, timer stage. The capturing stage consists antenna can captures all frequencies in the mobile communication spectrum from 0.9 to 3 GHz. This transmission stage uses a 0.22µF disk capacitor , this capacitor (C3) connected between the inverting and non-inverting inputs of the op-amp. This capacitor stores energy and transfers the stored energy in the form of minute current to the input of the

resistors and capacitors network . In the astable mode of operation , the frequency and duty cycle can be controlled independently with two external resistors and a single capacitor. The threshold and trigger levels normally are two - thirds and one - third , respectively , of VCC . These levels can be altered by use of the control voltage terminal . When current to voltage converting stage.

ISSN: 2278-4632
Vol-08 Issue-01 : 2018

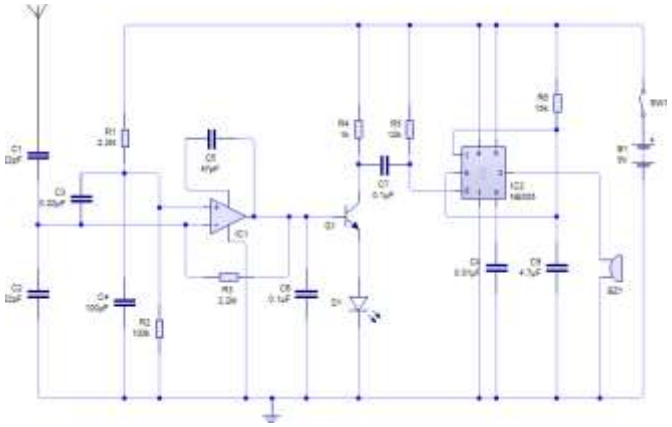

Fig .1 Circuit Diagram

The current to voltage converting stage converts the minute current from the previous stage into the corresponding output voltage by using a current to voltage converter operational amplifier (CA3130). Capacitor C4 along with high-value resistor R1 keeps the non-inverting input stable for easy swing of the output to high state. R2 provides the discharge path for capacitor C4. Feedback resistor R3 makes the inverting input high when the output becomes high. Capacitor C5 is connected across 'strobe' (pin 8) and 'null' inputs (pin 1) of IC1 for phase compensation and gain control the frequency response. When the cell phone detector signal is detected by C3, the output of IC1 becomes high and low alternately according to the frequency of the signal as indicated by LED. The output of the IC1 will activate the transistor Q1 and hence LED will glow. This also triggers monostable timer IC2 through capacitor C7. When the monostable timer IC2 is triggered, this will sound the buzzer. Capacitor C6 maintains the base bias of the transistor Q1.

PCB PREPARATION FOR PROPOSED MODULE

Fig 2 represents the PCB Layout of our proposed module. This has been developed in the Circuit Wizard Software.

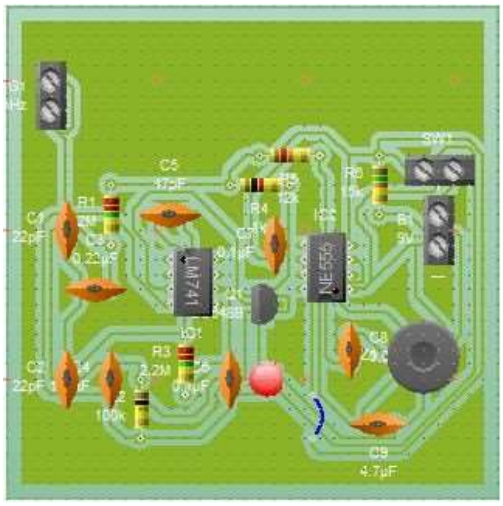

Fig.2 PCB Layout

ISSN: 2278-4632
Vol-08 Issue-01 : 2018

Fig 3 represents artwork layout structure of PCB

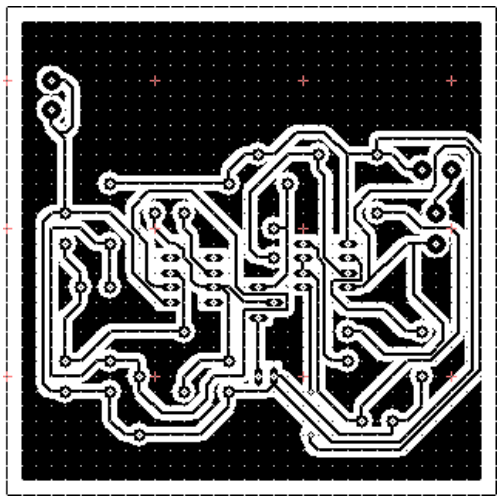

Fig.3 Artwork Layout of PCB

APPLICATIONS

There are several use of this proposed system. Some of which are (a) To avoid fault or any type of cheating in examination halls. (b) To avoid accidents at petrol pumps. (c) to avoid miscommunication in conference hall. (d) to avoid video transmission in a secret or private meeting. (e) can be used in military and civil defence for security purpose (f) can be to maintain silence in religious places like temple , church , etc.

CONCLUSION AND FUTURE SCOPE

This project is very useful for the private meetings , examination hall , defense establishment , military camps , petrol pumps, etc ., where the use of an active mobile communication devices are prohibited . With the aid of this system one can detect the active mobile phone device like objects and GPS systems from the range of few centimeters to few inches depending upon the objects transmission strength and other useful parameters . This device can detect objects within a radius of 1.5 meters of radius and operating in the frequency range of 0.9 to 3.3GHz .The system has no way of discriminating between two phones within the same frequencyrange .Therefore it is expected that future research will look into this area .

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