MOBILE PHONE DETECTOR

A DLD Lab Project

Made By:
Awais Ali 014

Introduction

A mobile phone detector can detect the activation of a mobile phone such as; incoming and ongoing phone calls, messages, and things in that nature. Mobile phone detectors can be used for spying on someone and for unauthorized video transmission. Whenever when the phone is on silent mode, a mobile phone detector can detector various things from a mobile device. Overall, mobile phone detectors can prevent the use of mobile phones in prisons, movie theaters, classrooms, and in any facility that individuals do not allow cellphone usage

Usage in the industry:

Mobile phone detector is important to industry due to its ability to add safety to many businesses, offices, classrooms, etc. For prison for example, individuals smuggle phones into prisons on a day-to-day basis, due to inmates using the mobile device to orchestrate an escape plan, orchestrating ways to smuggle more contraband into the prison, and much more that is not good for the prison system. On top of that, individuals use mobile devices in classrooms to cheat on example and to send the answer around, so many schools implemented mobile devices to restrict cheating from occurring. Also , within classrooms mobile devices can be a huge distraction from a student receiving his or her education. Lastly, for offices it can restrict distraction so that employees can focus the importance of each meeting he/she attends.

Basic Explanation of Mobile Phone Detector Circuit

When the circuit detects an RF signal from an activated mobile phone, it gives an indication by switching ON an LED. The LED will start blinking and continues to blink until the incoming/outgoing signal stops. Mobile Phone detector can also be called as a Frequency Detector. Frequency Detector is simply a Current to Voltage Converter Circuit which detects the frequencies in between the range of about 800 MHz to 3GHz.

List of Components used:

i. CA3130 IC
ii. 1kΩ resistor
iii. 100kΩ resistor
iv. Two 2.2MΩ resistors
v. 47pF capacitor
vi. 0.22μF capacitor
vii. 100μF capacitor
viii. BC548 Transistor
ix. Light-emitting Diodes
x. Power Supply 9V
xi. Wires
xii. Breadboard

Breadboard:

A breadboard, or protoboard, is a construction base for prototyping of electronics. It allows for easy access to simulate a working model for the electronics without soldering them into each other and is effective at spreading its current around line by line once connected to a battery.

Integrated Circuit (IC):

An integrated circuit or monolithic integrated circuit is a set of electronic circuits on one small flat piece of semiconductor material, usually silicon. Large numbers of tiny MOSFETs integrate into a small chip.
The IC we have used is a CA3130 Comparator Op-Amp.

Transistor:

A transistor is a semiconductor device used to amplify or switch electrical signals and power. The transistor is one of the basic building blocks of modern electronics. It is composed of semiconductor material, usually with at least three terminals for connection to an electronic circuit.
The transistor we have used is a BC548 Transistor.

Capacitor:

A capacitor is a device that stores electrical energy in an electric field. It is a passive electronic component with two terminals. The effect of a capacitor is known as capacitance.

The Capacitors we have used are:

- 47pF capacitor
- 0.22μF capacitor
- 100μF capacitor

Resistors:

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.

The resistors we have a used are:

- 1kΩ resistor
- 100kΩ resistor
- Two 2.2MΩ resistors

LED:

A light-emitting diode is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.
We decided to use 1 single LED to indicate the detection of a mobile phone.

Battery:

An electric battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode.

Working of the circuit

Ordinary LC circuits are used to detect low frequency radiation in the AM and FM bands. The tuned tank circuit having a coil and a variable capacitor retrieve the signal from the carrier wave. But such LC circuit cannot detect high frequency waves near the microwave region. Hence in the circuit, a capacitor is used to detect RF from mobile phone considering that, a capacitor can store energy even from an outside source and oscillate like LC circuit.

One lead of the capacitor gets DC from the positive rail and the other leads gone to the negative input of IC. So the capacitor gets energy for storage. This energy is applied to the inputs of IC so that the inputs of IC are almost balanced with 1.4 volts. In this state output is zero. But at any time IC can give a high output if a small current is induced to its inputs. There a natural electromagnetic field around the capacitor caused by the 50 Hz from electrical wiring. When the mobile phone radiates high energy pulsations, capacitor oscillates and release energy in the inputs of IC. This oscillation indicated by the flashing of the LED. In short, capacitor carries energy and is in an electromagnetic field. So a slight change in field caused by the RF from phone will disturb the field and forces the capacitor to release energy.

Proteus Simulation: Could not be possible due to no way to simulate Phone signals.

Link to the Video:
https://drive.google.com/drive/folders/1upICHCax_QIJDBFomioLgat4HWeVSYhS?usp=sharing

Circuit Diagram: