

## A study on working and performance of Cell Phone Detector

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### **Abstract**

Cell phone detector is applied to control the cell phone in use for a specific region at that time instant. When signals arrive through the tower range, cell phone detector detects the location of the cell phone and it produces a sound as well as a light through the detector. With this we are able to detect the cell phone which is in use and can act accordingly. The present work is the extension of the previous research work done to develop the Cell phone detector. The present work involves implication of cell phone detector, for example, on increasing capacitor value to 6.6F, antenna range is also increased. Hence, detector can be applied in the range of 50m to 60 m. In this given range, the detector is capable to detect the cell phone which is in use and can easily control it.

**Keywords:** cell phone detector, capacitance, antenna, buzzer.555 TIMER.

### **INTRODUCTION**

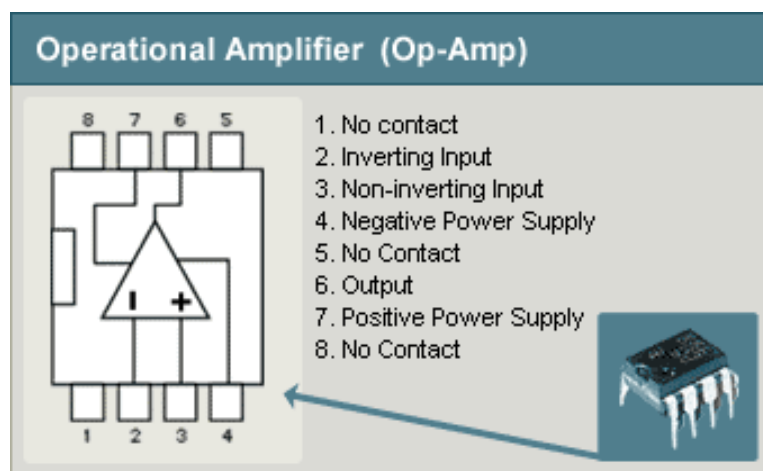
Cell phone detector is used to detect the cell phone while in unwanted areas such as school, college or confidential areas like, income tax office and other official places where use of cell phone is banned. There are times when it is difficult to entreat every cell phone user individually from using cell phone for a time period.

The present chapter gives a brief explanation about the components used in the circuit of cell phone detector.

### **COMPONENTS USED IN THE CIRCUIT**

In this circuit we are using Resistors, Capacitors, IC CA3130, Transistor, NE 555 Timer, Antenna, Piezo Buzzer, Power supply and LED.

### **COMPONENTS DESCRIPTION: IC CA 3130**



**Fig2.1.1** Pin configuration of IC CA 3130

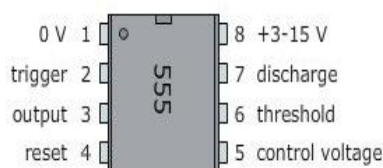
### ROLE OF IC CA 3130

This IC is a 15 MHz BiMOS Operational amplifier with MOSFET sources of incoming values and Bipolar yield. The data sources contain MOSFET transistors to give high input impedance and low output current as low as 10pA. It has high speed of execution and reasonable for low output current uses.

CA3130A and CA3130 are operational amps that consolidate the upside of both CMOS and bipolar transistors. Gate-ensured P-Channel MOSFET (PMOS) transistors are utilized as a part of the input circuit to give high-input impedance, low-input current, and outstanding speed execution. The utilization of PMOS transistors in the input organize brings about common mode input-voltage capacity down to 0.5V beneath the negative-supply terminal, an essential characteristic in single-supply applications.

A CMOS transistor-combine, fit for swinging the output voltage to inside 10mV of either supply-voltage terminal (at high estimations of load impedance), is utilized as the output circuit. The CA3130 Series circuits work at supply voltages going from 5V to 16V, (2.5V to 8V). They can be stage repaid with a solitary outer capacitor, and have terminals for change of offset voltage for applications requiring offset-invalid ability. Terminal arrangements are likewise made to allow strobing of the output level. The CA3130A offers better input attributes over those of the CA3130.

### NE 555 TIMER



*Fig 2.1.2 Pin configuration of ne 555 timer*

The NE555 IC is an exceedingly stable controller equipped for creating precise timing rules. With a monostable operation, the time postponement is controlled by one outside resistor and one capacitor. With an astable operation, the recurrence and obligation cycle are precisely controlled by two outside resistors and one capacitor.

### PIN DESCRIPTION

1. Ground, is the input pin of the wellspring of the negative DC voltage
2. trigger, negative input from the lower comparators (comparator B) that keep up oscillation capacitor voltage in the most reduced  $1/3 V_{cc}$  and set RS flip-flop
3. Output, the output pin of the IC 555.
4. Reset, the pin that serves to reset the lock inside the IC to be compelling to reset the IC work. This pin is associated with a PNP-sort transistor gate, so the transistor will be dynamic if given a rationale low. Regularly this pin is associated specifically to  $V_{cc}$  to avert reset
5. Control voltage, this pin serves to direct the soundness of the reference voltage negative input (comparator A). This pin can be left hanging, however to guarantee the dependability of the reference comparator An, as a rule related with a capacitor of around 10nF to berorde pin ground
6. Threshold, this pin is associated with the positive input (comparator A) which will reset the RS flip-flop when the voltage on the capacitor from surpassing  $2/3 V_c$
7. Discharge, this pin is associated with an open collector transistor Q1 is associated with ground emitternya. Changing transistor serves to brace the comparing hub to ground on the planning of certain
8.  $V_{cc}$ , pin it to get a DC voltage supply. Typically will work ideally if given a 5-15V. The current supply can be

found in the datasheet, which is around 10-15mA.

### LIGHT EMITTING DIODE: (LED)

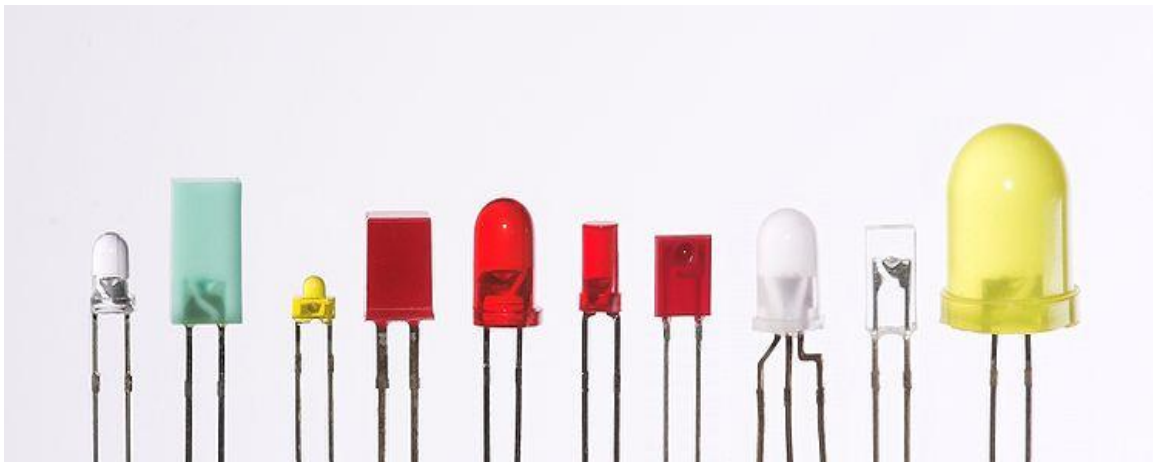
A light-emitting diode (LED) is an electronic light source. LEDs are utilized as indicating lights in numerous sorts of electronics and progressively to light. LEDs work by the impact of electroluminescence, found coincidentally in 1907. The LED was presented as a practical electronic segment in 1962. Every single early devices transmitted low-force red light, yet present day LEDs are accessible over the visible, ultraviolet and infra red wavelengths, with high brightness.

LEDs depend on the semiconductor diode. At the point when the diode is forward biased (switched ON), electrons can recombine with openings and vitality is discharged as light. This impact is called electroluminescence and the shade of the

light is controlled by the vitality hole of the semiconductor. The LED is normally little in range (under 1 mm<sup>2</sup>) with incorporated optical parts to shape its radiation example and aid reflection.

LEDs display many preferences over conventional light sources including lower vitality utilization, longer lifetime, enhanced vigor, littler size and speedier switching. Nonetheless, they are generally costly and require more exact current and warmth administration than customary light sources.

Applications of LEDs are diverse. They are used as low-energy indicators but also for replacements for traditional light sources in general lighting, automotive lighting and traffic signals. The compact size of LEDs has allowed new text and video displays and sensors to be developed, while their high switching rates are useful in communications technology.



*Fig 2.1.3 various types of light emitting diodes.*

### PIEZZO BUZZER

Piezoelectricity is the capacity of a few materials (remarkably gems and certain ceramics, including bone) to produce an electric field or electric potential in light of connected mechanical anxiety. The impact is firmly identified with a change of polarization thickness inside the material's volume. In the event that the material is

not short-circuited, the connected anxiety incites a voltage over the material. The word is gotten from the Greek piezo or piezein, which intends to crush or press. A bell or beeper is a flagging gadget, generally electronic, commonly utilized as a part of vehicles, family unit machines, for example, microwave broilers, or diversion appears.

It most regularly comprises of various switches or sensors associated with a control unit that decides whether and which catch was pushed or a preset time has slipped by, and as a rule enlightens a light on the proper catch or control board, and sounds a notice as a consistent or discontinuous humming or beeping sound.

At first this gadget depended on an electromechanical framework which was indistinguishable to an electric ringer without the metal gong (which makes the ringing clamor). Regularly these units were tied down to a divider or roof and utilized the roof or divider as a sounding board. Another usage with some AC-associated gadgets was to execute a circuit to make the AC current into a clamor sufficiently uproarious to drive an amplifier and attach this circuit to a 8-ohm speaker. These days, it is more mainstream to utilize a clay-based piezoelectric sounder which makes a shrill tone. Normally these were snared to "driver" circuits which differ the pitch of the sound or beat the sound on and off.

In game shows, it is otherwise called a "lockout framework" since when one individual signs ("hums in"), all others are bolted out from flagging. A few diversion indicates have substantial ringer catches which are distinguished as "plungers". The bell is additionally used to flag wrong answers and when time terminates on many diversion shows, for example, Wheel of Fortune, Family Feud and The Price is Right. "Buzzer" originates from the grating commotion that bells made

when they were electromechanical gadgets, worked from ventured down AC line voltage at 50 or 60 cycles. Different sounds usually used to demonstrate that a catch has been squeezed are a ring or a beep.



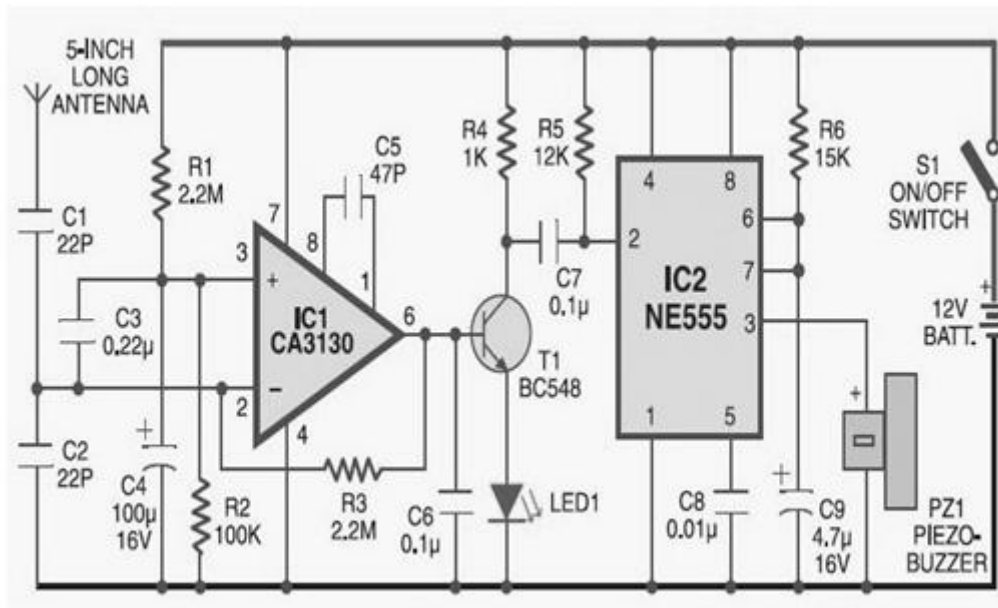
*Fig 2.1.4 piezo electric buzzer.*

After analyzing the various components of the cell phone detector the following chapter gives novel means of detecting mobile phones which are used in the restricted areas.

### **CIRCUIT DESIGN**

The present briefs about the circuit and its working guideline.

The circuit is planned to recognize unapproved utilization of cell phones in examination lobbies, confidential rooms and soon. It additionally identifies unapproved video and sound recordings. It distinguishes the signs from cell phones regardless of the possibility that it kept in the noiseless mode. Created waveform of the PDA is radiofrequency one with a wavelength of 30 cm. Subsequently the circuit is composed in such an approach to detect the radio frequency wave. Turning out from the mobile phone when its being utilized and after that passed on to the output as an alarm or LED signal.



**Fig 1 CIRCUIT DIAGRAM**

**DESCRIPTION OF THE CIRCUIT:**

A normal RF locator utilizing tuned LC circuits is not appropriate for distinguishing signals in the GHz recurrence band utilized as a part of cell phones. The transmission recurrence of cell phones ranges from 0.9 to 3 GHz with a wavelength of 3.3 to 10 cm. So a circuit identifying gigahertz signs is required for a mobile bug. Here the circuit utilizes a 0.22µF capacitor (C3) to catch the RF signals from the cell phone. The lead length of the capacitor is settled as 18 mm with a dividing of 8 mm between the prompts get the coveted recurrence. The plate capacitor alongside the leads goes about as a little gigahertz circle receiving wire to gather the RF signals from the cell phone.

Operation amp IC CA3130 (IC1) is utilized as a part of the circuit as a current-to-voltage converter with capacitor C3 associated between its modifying and non-reversing inputs. It is a CMOS adaptation utilizing gate-secured p-divert MOSFET transistors in the input to give high input impedance, low input current and rapid of

execution. The output CMOS transistor is fit for swinging the output voltage to inside 10 mV of either supply voltage terminal.

Capacitor C3 in conjunction with the lead inductance goes about as a transmission line that blocks the signs from the cell phone. This capacitor makes a field, stores vitality and exchanges the put away vitality as moment current to the inputs of IC1. This will agitate the adjusted input of IC1 and change over the current into the comparing output voltage.

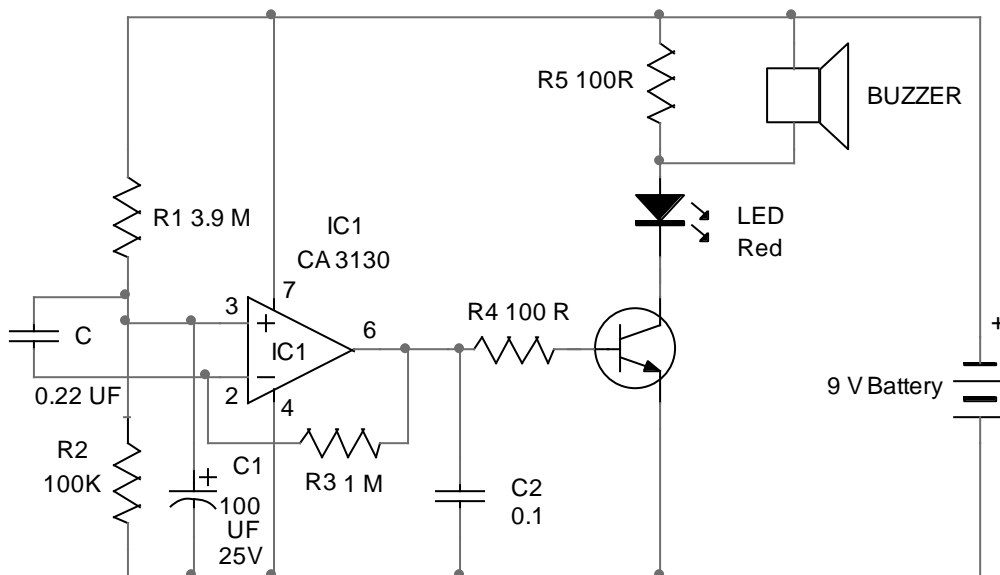
Capacitor C4 alongside high-esteem resistor R1 keeps the non-rearranging input stable for simple swing of the output to high state. Resistor R2 gives the release way to capacitor C4. Criticism resistor R3 makes the modifying input high when the output turns out to be high. Capacitor C5 (47pF) is associated crosswise over "strobe" (stick 0 and "invalid" inputs (stick 1) of IC1 for stage remuneration and pick up control to advance the recurrence reaction.

At the point when the cell phone flag is distinguished by C3, the output of IC1 turns out to be high and low then again as indicated by the recurrence of the flag as demonstrated by LED1. This triggers monostable clock IC2 through capacitor C7.

Capacitor C6 keeps up the base inclination of transistor T1 for quick exchanging activity. The low-esteem timing segments R6 and C9 deliver brief time postponement to maintain a strategic distance from sound aggravation.

**WORKING OF THE CIRCUIT**

Normal LC (Coil-Capacitor) circuits are utilized to distinguish low recurrence radiation in the AM and FM groups. The tuned tank circuit having a loop and a variable capacitor recover the flag from the transporter wave. Be that as it may, such LC circuits can't identify high recurrence waves close to the microwave locale. Subsequently in the circuit, a capacitor is utilized to distinguish RF from cell phone considering that, a capacitor can store vitality even from an outside source and waver like LC circuit.



**USE OF CAPACITOR**

A capacitor has two terminals isolated by a "dielectric" like paper, mica and so on. The non energized circle capacitor is utilized to pass AC and not DC. Capacitor can store vitality and pass AC signals amid release. 0.22 Capacitor is chosen since it is a low esteem one and has huge surface territory to acknowledge vitality from the versatile radiation. To identify the flag, the sensor part ought to resemble an aeronautical.

So the capacitor is organized as a smaller than normal circle airborne (like the dipole receiving wire utilized as a part of TV).In

short with this plan, the capacitor works like an air center loop with capacity to waver and release current.

**HOW THE CAPACITOR SENSES RF?**

One lead of the capacitor gets DC from the positive rail and the other lead goes to the negative input of IC1. So the capacitor gets vitality for capacity. This vitality is connected to the inputs of IC so that the inputs of IC are practically adjusted with 1.4 volts. In this state output is zero.

In any case, whenever IC can give a high output if a little current is prompted to its inputs. There a characteristic

electromagnetic field around the capacitor brought on by the 50Hz from electrical wiring. At the point when the cell phone emanates high vitality throbs, capacitor sways and discharge vitality in the inputs of IC.

This wavering is demonstrated by the flashing of the LED and beeping of Buzzer. To put it plainly, capacitor conveys vitality and is in an electromagnetic field. So a slight change in field created by the RF from telephone will exasperate the field and strengths the capacitor to release energy.

#### **APPLICATION**

- It can be utilized to forestall utilization of cell phones in examination lobbies, confidential rooms, and so on.
- It is likewise helpful for recognizing the utilization of cell phone for spying and unapproved video transmission.
- It is valuable where the utilization of cell phone is denied like oil pumps and service stations, historical places, religious places and court of laws.

#### **LIMITATION**

##### **RANGE OF THE CIRCUIT:**

The model adaptation has just constrained scope of 2 meters. Be that as it may, if a preamplifier arrange utilizing JFET or MOSFET transistor is utilized as an interface between the capacitor and IC, range can be expanded.

#### **CONCLUSION and Future Works**

This pocket-estimate versatile transmission indicator or sniffer can detect the nearness of an initiated portable cell phone from a separation of one and-a-half meters. So it can be utilized to anticipate utilization of cell phones in examination lobbies, classified rooms, and so forth. It is likewise helpful for identifying the utilization of cell phone for spying and unapproved video transmission. The present work entitled "CELL phone

DETECTOR" is one such gadget which is utilized to distinguish the radio recurrence created by PDA set up where its use is denied. Trying to increase the detecting range of mobile bug to few more meters for observing wide range of area

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