

CELLULAR DEVICE DETECTION IN RESTRICTED PREMISIS

A MINI PROJECT REPORT

Submitted by

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In partial fulfilment of co-curricular activities

Organized by

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**



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TABLE OF CONTENTS

S.NO	CONTENT	PAGE.NO
1	INTRODUCTION	3
2	COMPONENTS	3
3	CIRCUIT DIAGRAM	4
4	IC3130	4
5	SPECIFICATIONS AND APPLICATIONS OF IC	6
6	PROCEDURE	7
7	WORKING	11
8	OUTPUT	12
9	APPLICATION	13
10	CONCLUSIONS	14

INTRODUCTION

The most powerful portable electronic gadget a person can control today is a cell phone or mobile phone. The demand for Mobile phones shown tremendous rapid growth in recent years drastically. The Mobile phone can transmit and receives the signal in the range of 0.9-3 GHz. Just a few electronic components are required for this project. Nothing expensive is used in this project. This project is ideal for school students and anyone can build this amazing small project in the lab.

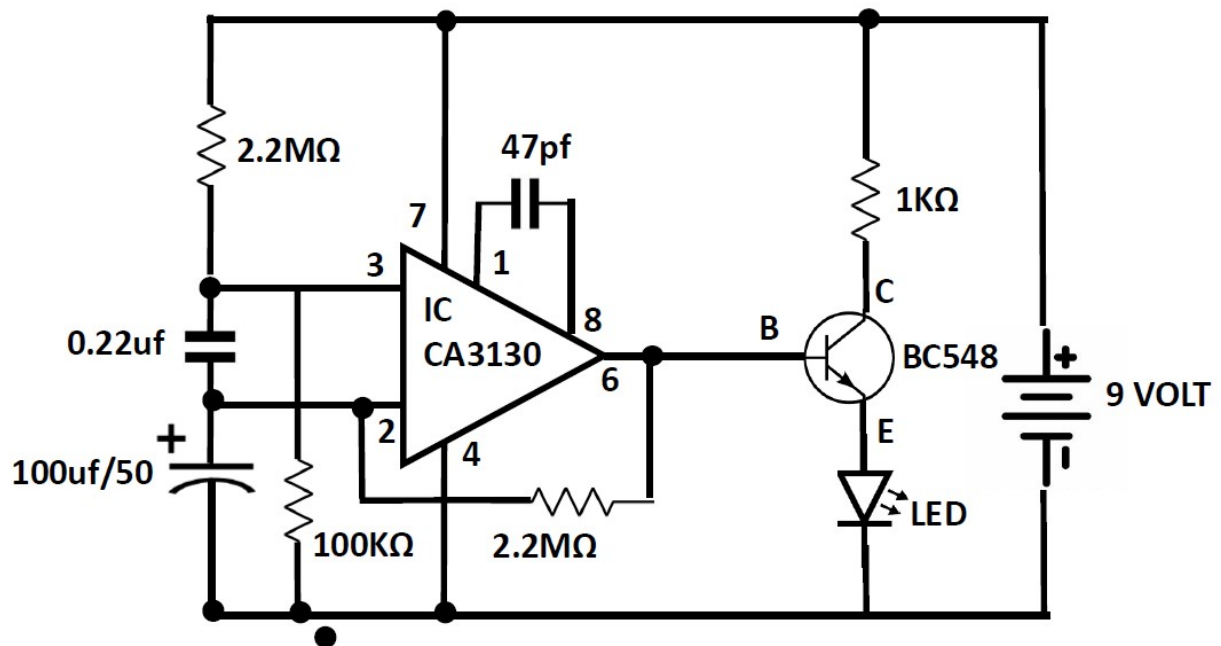
PRINCIPLE

The basic principle of cell phone or mobile detector is to detect the RF signal frequencies. This circuit is designed in such a way that it rectifies low signal frequencies with very low noise of rate. When an inductor is placed near a RF signal frequency source it receives the signal through the principle of mutual induction. And the low power signals are amplified and transmit the power to any indicator which shows the response as we have used LED in our experiment. Using this small electronics circuit, we can detect the sending or receiving of messages, or when a call is received or dialed.

COMPONENTS USED

1. IC CA3130	- 1
2. TRANSISTOR BC548	- 1
3. RESISTOR 2.2M Ω	- 2
4. RESISTOR 100K Ω	- 1
5. RESISTOR 1K Ω	- 1
6. CAPACITOR 100 μ f/50V	- 1
7. CAPACITOR 0.22 μ f	- 1
8. CAPACITOR 47 pf	- 1
9. LED3V	- 1
10. BATTERY9V	- 1
11. 9V BATTERY CLIP	- 1
12. CONNECTING WIRES	- FEW
13. PCB BOARD 5X7	- 1

CIRCUIT DIAGRAM



About the IC CA3130 :

CA3130 and CA3130A are op-amps “Operational amplifiers” 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.

The CA3130 Series circuits operate at supply voltages ranging from 5V to 16V, (2.5V to 8V). They can be phase compensated with a single external capacitor and have terminals for adjustment of offset voltage for applications requiring offset-null capability. Terminal provisions are also made to permit strobing of the output stage.

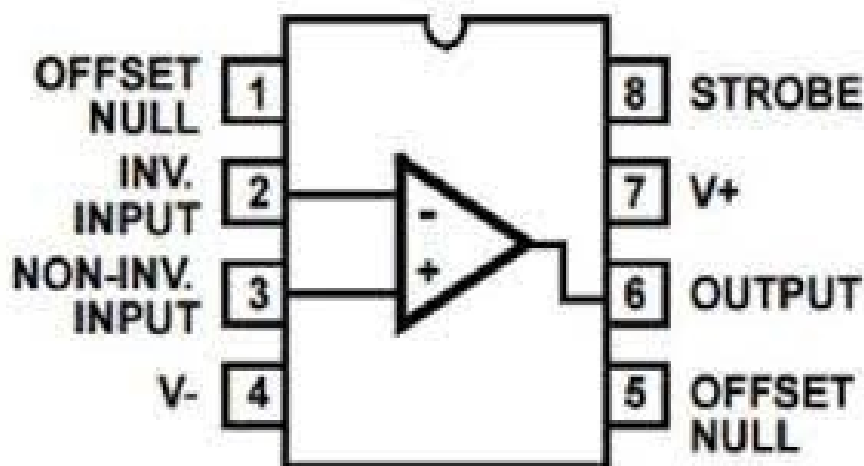


The CMRR of CA3130 IC is 80dB. Here, the rejection ratio is the capacity of the device to refuse common-mode signals. So it is the ratio of differential-mode gain & common-mode gain.

The CA3130 is available with high i/p impedance because of the in-built MOSFETs. Whenever the sensor output voltage is connected to the inverting and non-inverting terminals of the IC, then the sensors output voltage doesn't modify its value. This IC has low power utilization, high BW, quick sample rate and max i/p impedance.

CA3130 CMOS Op-Amp Pin Configuration

The pin configuration of CA3130 CMOS Op-Amp is shown below. This IC includes 8-pins where each pin & its functionality is discussed below.



Pin1 (Offset Null Pin): It is used to fix the offset voltage

Pin2 (Inverting Pin IN -): A stable voltage is given to this IN-pin

Pin3 (Non-inverting Pin IN +): An uneven voltage is given to this IN+ pin

Pin4 (Vcc-): It is a GND pin

Pin5 (Offset Null Pin): It is used to fix the offset voltage

Pin6 (Output): The o/p pin of the IC

Pin7 (Vcc+): It is a voltage supply pin where the voltage ranges from 5V – 16V

Pin8 (Strobe): It is used to switch off the o/p stage

Features & Specifications

The features and specifications of the CA3130 CMOS op-amp include the following.

- Max sink current is 20mA
- i/p terminal current is 1mA
- Duration of o/p short circuit is Indefinite
- CMRR (Common Mode Rejection Ratio) is 80dB
- DC i/p voltage ranges from +8V to -0.5V
- The power supply range is wide
- Differential i/p voltage is 8 V
- Single supply ranges from – 5V to 16V
- DC voltage supply is 16 V
- Double supply ranges from – $\pm 2.5V$ to $\pm 8V$
- Common mode i/p voltage range mainly includes -ve supply rail and input terminals can swing 0.5V under -ve supply rail
- Output Voltage Max is 13.3V
- CMOS o/p stage allows swing of signal to any or both supply rails
- Op-amp included with MOSFET on the output
- It is perfect for the applications of a single supply
- Max source current is 22mA
- Current supply is 10mA

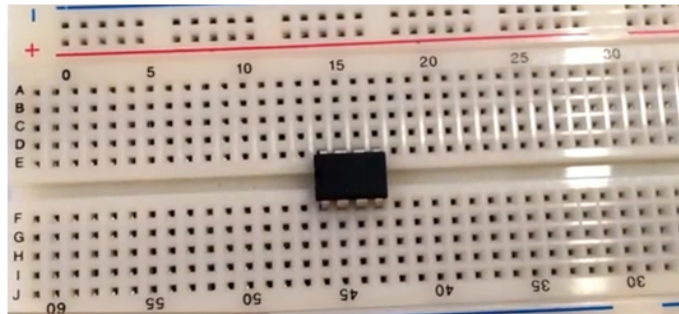
Applications of IC CA3130

The applications of CA3130 CMOS op-amp include the following.

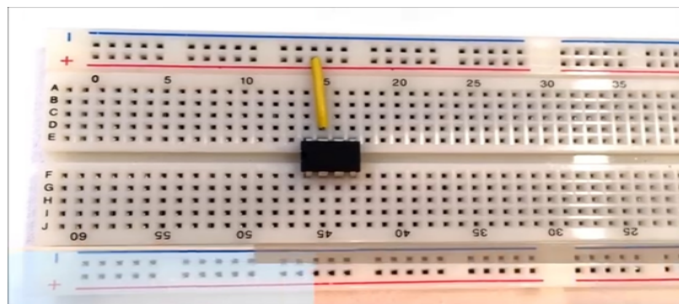
1. Used in mobile jammers, oscillator circuits, DAC circuits, voltage follower, noise detectors, peak signal, distorter, or frequency generator.
2. These ICs are used to build engineering projects
3. This operational amplifier is used for amplification purposes and is also used like a voltage regulator, comparator, and voltage follower by using exterior components.
4. This IC is used where high input impedance, high bandwidth & low input current is required.
5. These are applicable in multivibrators and voltage followers because of their maximum input resistances.
6. This op-amp is used as an integrator in function generator & threshold detector.
7. This IC uses additional components to perform different conversions like frequency to voltage & temperature to frequency.
8. It is used to design oscillators & digital to analog converter

PROCEDURE

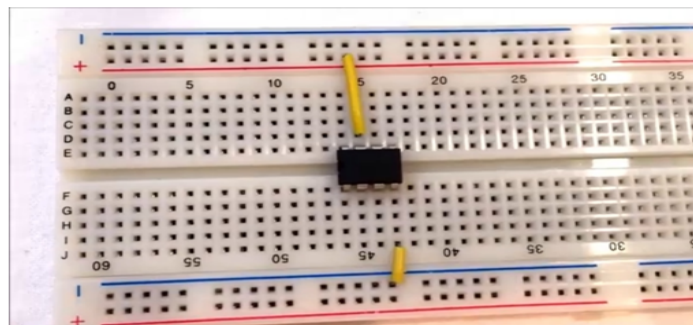
1. Insert CA3130 on the breadboard



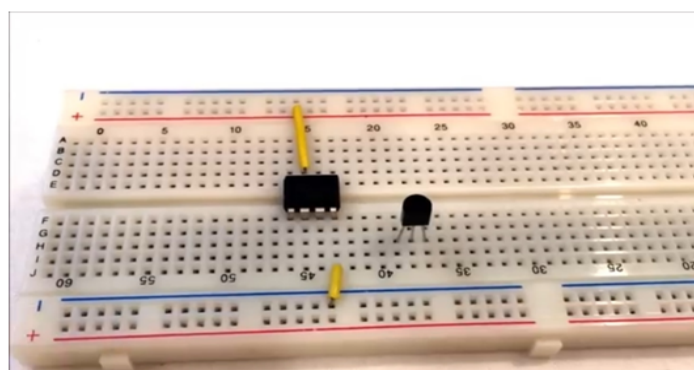
2. Connect pin 7 to the positive rail



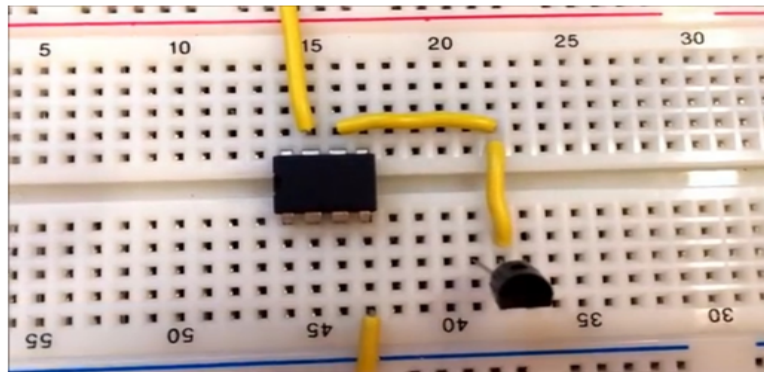
3. Connect pin 4 to the negative rail of the bread board



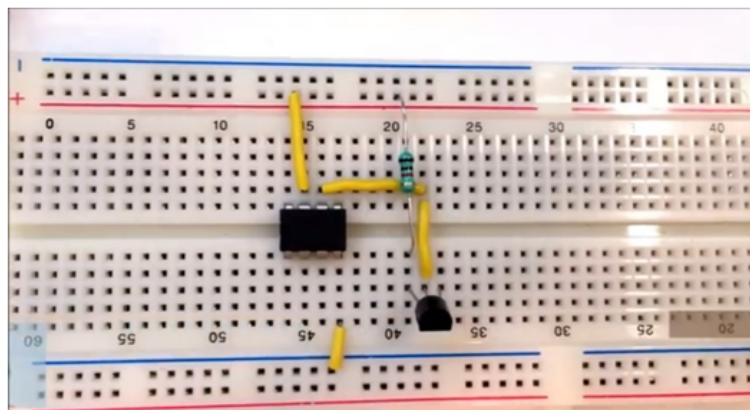
4. Now we insert the BC548 transistor on the Breadboard



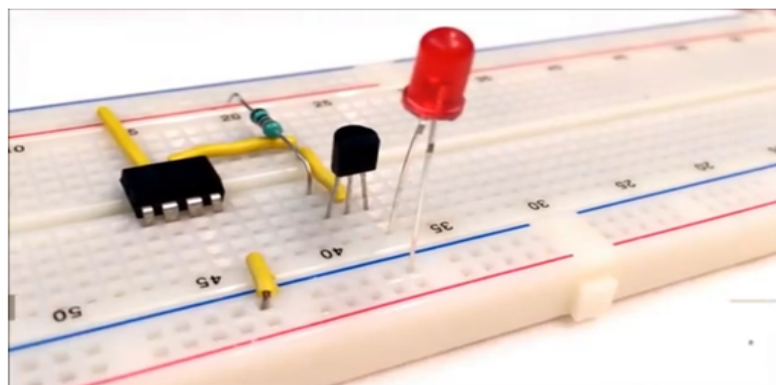
5. Now connect pin 6 to the base of BC548



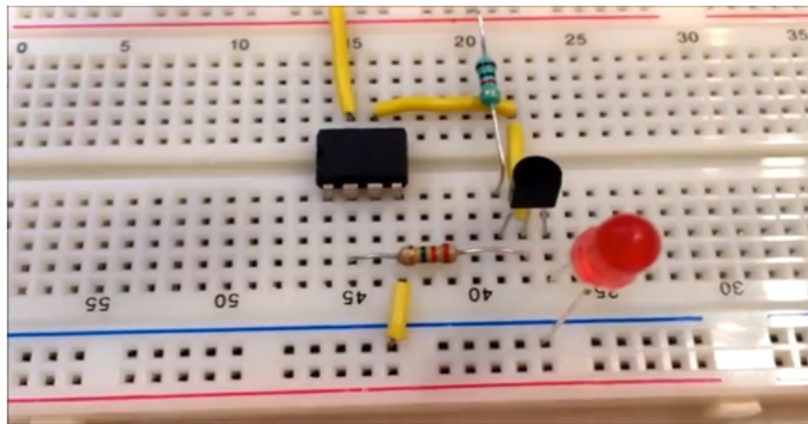
6. Connect the collector of Bc548 to the positive rail using a 1K ohm resistor.



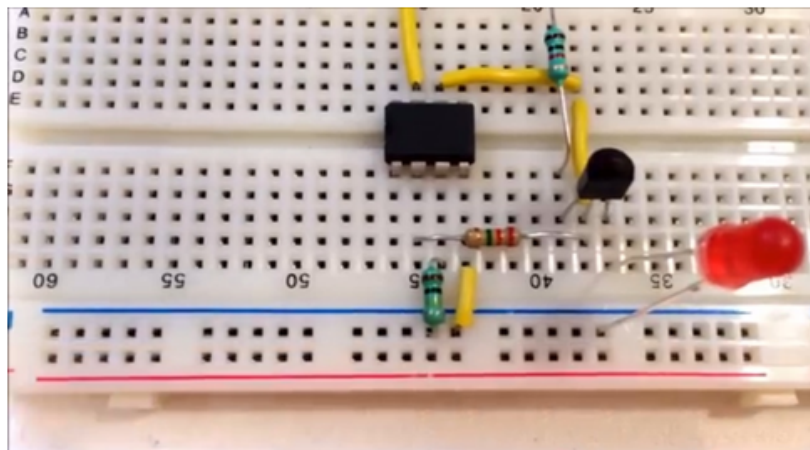
7. Now insert the LED light on the BreadBoard circuit with the Anode connected to the emitter of BC548 and cathode connected to the negative rail.



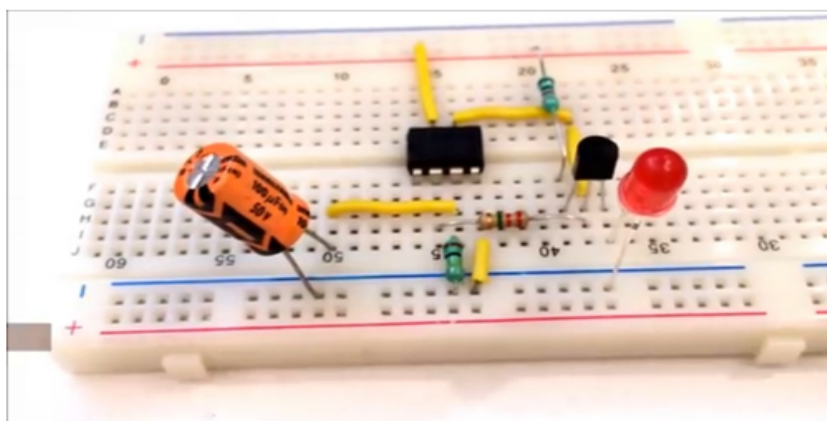
8. Connect pin 2 to the base of BC548 using a 2.2M ohm resistor



9. Connect pin 3 to the negative rail using a 100k ohm resistor.

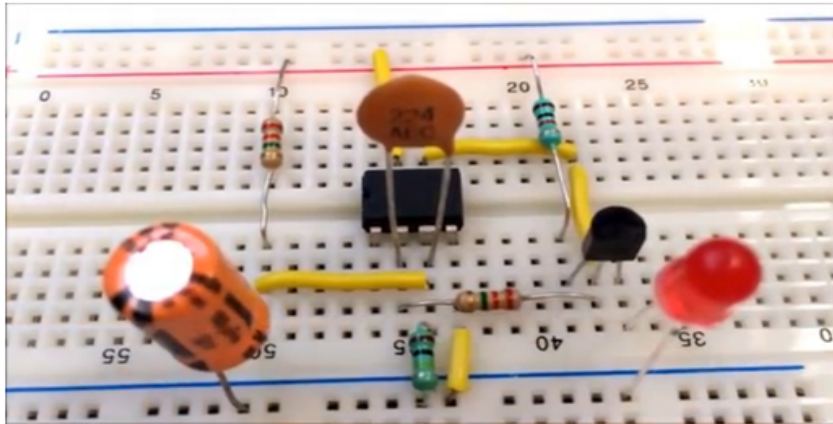


10. Insert the 100micro F capacitor with one of its pin connected to the anode of the capacitor to the pin 3 and its cathode to the negative rail

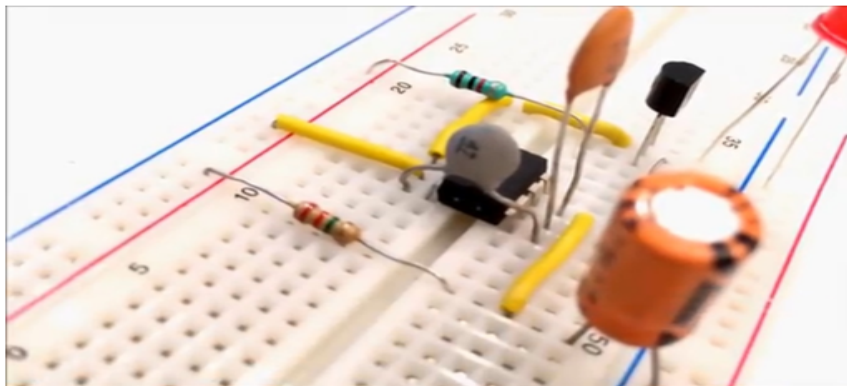


11. Connect pin 3 to the positive rail using a 2.2M ohm resistor.

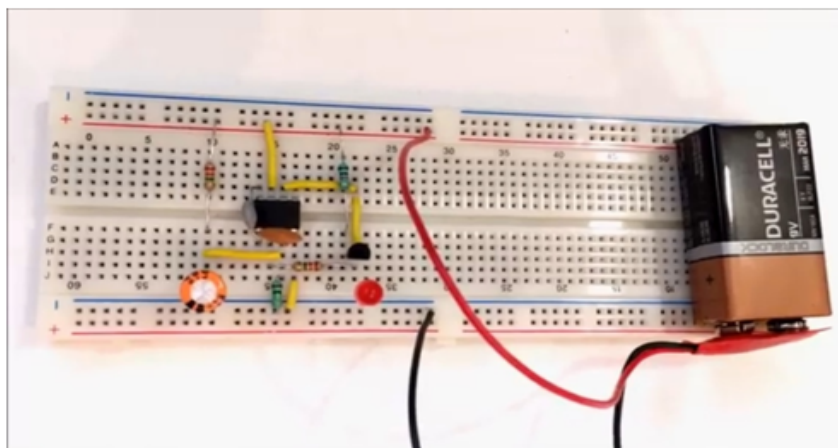
12. Now connect pin 2 of the breadboard and another pin 3 with the 0.22micro Farad capacitor.



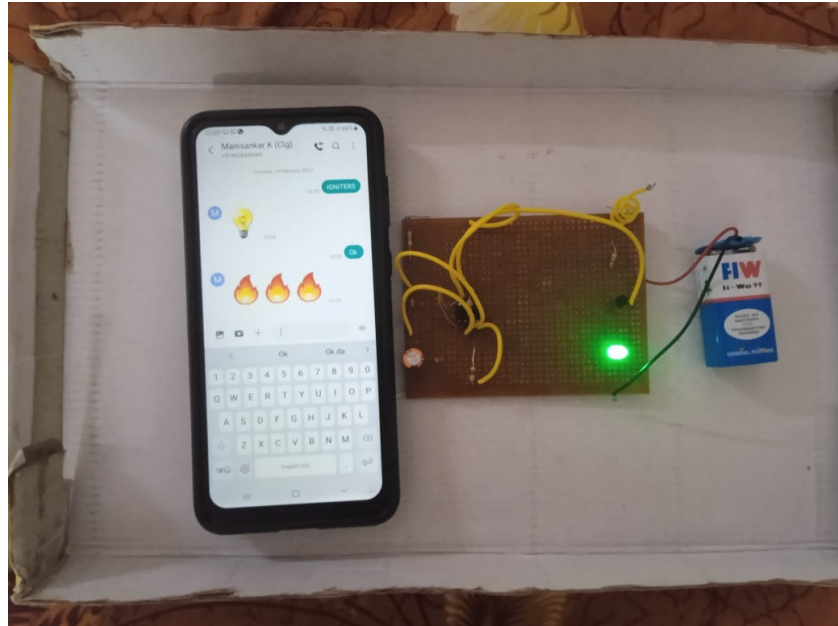
13. Now Connect pin 1 of IC to the pin 8 using the 47pF capacitor.



14. Connect the power supply to the breadboard of the circuit.



WORKING

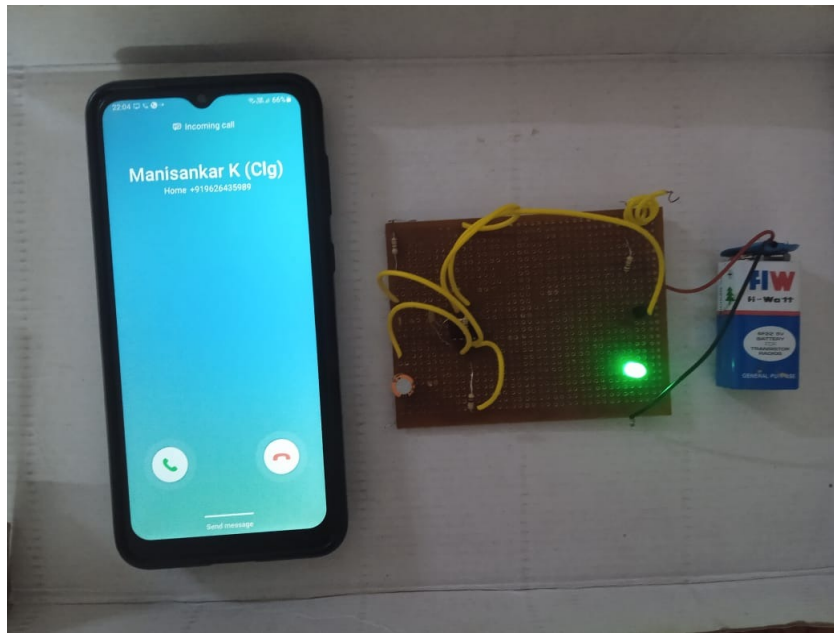


Cellular device detection in restricted premises typically involves using specialized equipment to detect and locate cell phone signals within a designated area, such as a prison or government building. The goal is to prevent unauthorized communications and activities that could compromise security or confidentiality. The working process of cellular device detection in restricted premises typically involves the Initial planning and assessment This involves identifying the scope of the restricted area, the types of cellular devices that may be present, and the potential risks associated with unauthorized use. Equipment selection and installation Specialized equipment, such as radio frequency scanners, are installed in the restricted area to monitor and detect cellular signals. The equipment must be carefully selected and placed to provide the desired coverage while minimizing interference with other wireless communications. Monitoring and analysis The equipment constantly monitors the area for cellular signals and captures data on the frequency, strength, and location of detected devices. This data is then analyzed to identify unauthorized devices and determine their location. Response and mitigation When an unauthorized device is detected, appropriate actions are taken to mitigate the threat. This may involve blocking the device's signal, locating and confiscating the device, or alerting security personnel to investigate further. Overall, cellular device detection in restricted premises is a complex process that requires careful planning, specialized equipment, and ongoing monitoring and analysis to ensure effective security measures

.OUTPUT

Testing of the circuit with the mobile connecting operation:

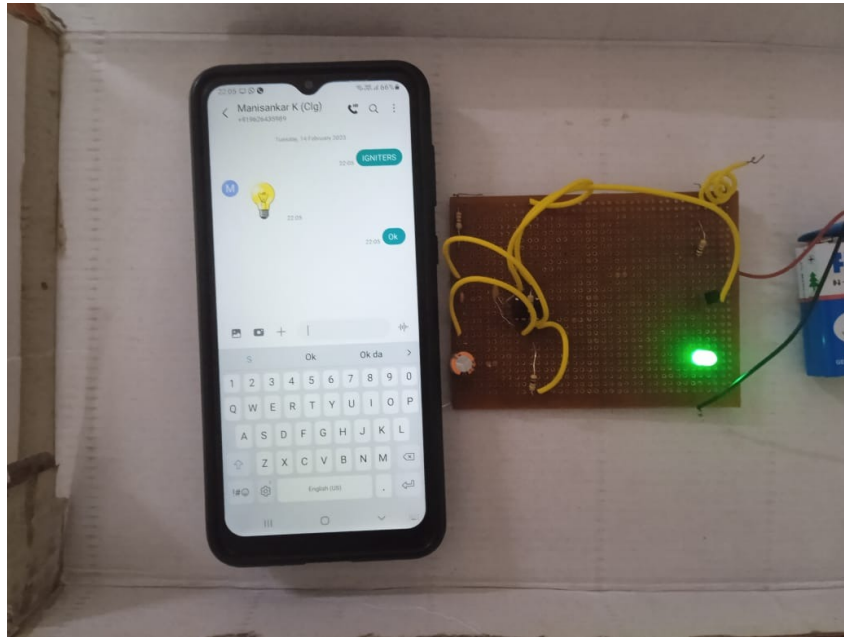
When a phone call comes to our phone (Incoming call) the LED also blinks.
As you can see



And when we make a call from our phone (outgoing call) the LED of the circuit starts blinking till the phone rings.



Till the message goes it blinks and stops when it sends to the receiver. And same applies when it receives the message it starts blinking (Incoming text message).



And we reject the call it stops blinking. It also works when a person sends a message to someone as you can see an outgoing text message.

CELL PHONE DETECTOR CIRCUIT APPLICATIONS

1. Government agencies and military: Used to detect the presence of unauthorized cell phones in secure locations.
2. Corporate offices and schools: Used to enforce "no cell phone" policies and prevent cheating during exams.
3. Prisons and detention centers: Used to prevent the use of cell phones by inmates to avoid outside contact.
4. Museums and art galleries: Used to prevent the use of cell phones from damaging valuable exhibits.
5. Hospitals and medical facilities: Used to prevent the use of cell phones that may interfere with medical equipment.
6. Conferences and meetings: Used to prevent distractions and ensure a cell-phone-free environment.

CONCLUSION

In conclusion, cellular device detection and restriction in restricted premises is a necessary measure for ensuring security, safety, and privacy. Such premises include places like government buildings, hospitals, schools, and other sensitive locations. With the increased use of mobile devices, it has become essential to restrict their use in certain areas to prevent unauthorized access and protect sensitive information. By utilizing specialized technology, such as signal jammers and detection systems, it is possible to limit the use of cellular devices and prevent potential security breaches. However, it is important to balance these measures with the legitimate needs of individuals to access emergency services or communicate with family and friends. Ultimately, a comprehensive approach that combines effective communication, education, and enforcement can help strike the right balance and ensure a safe and secure environment for all.