

MULTITONE JAMMER

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ABSTRACT- project aims to design and implement a multitone jammer that is capable of disrupting the communication systems of wireless devices by emitting signals on multiple frequencies simultaneously. The project involves a study of various jamming techniques, signal processing, and design of the jamming system. The project also involves the selection of suitable frequency bands and modulation techniques for effective jamming. The multitone jammer will be designed using digital signal processing techniques such as signal synthesis and high-speed digital-to-analog converters. The device's performance will be validated through simulation and experimental testing. The project will evaluate the effectiveness of the multitone jammer in a controlled environment by testing it against various wireless devices. The project's contribution will be a functional multitone jammer that has potential applications

keywords: jammer, Working of jammer, NE555 IC Timmer, Components of jammer.

I: INTRODUCTION

Our project is the requirement of the HAL (Hindustan Aeronautics Limited), to design a jammer that can jam the signals of a device (remote control aircrafts, mobile phone, etc.) in a particular frequency range area. We are design a jammer that can jam the signals in the range of 2.4GHZ to 5GHZ. A jammer is an electronic device that is designed to block communication signals by emitting radio frequency (RF) signals of the same frequency as the target signal. The purpose of a jammer is to prevent the transmission or reception of signals in a particular area such as a military base, prison, or theater. Jammers are often used as a security measure against drones, motor vehicle theft, and mobile phone crimes. However, the use of jammers is strictly regulated by law in many countries due to their potential to disrupt critical or emergency communications. The specifications of a jammer can vary depending on its intended purpose and usage. However, some common specifications of a jammer may include:

1. Frequency Range: The frequency range refers to the range of frequencies that the jammer is designed to block or interfere with. This can range from a single frequency to multiple frequencies.

2. **Signal Strength:** The signal strength refers to the power output of the jammer, which determines how effective it is at blocking or interfering with signals.

3. **Battery Life:** The battery life defines how long the jammer can function on a single charge. This can vary depending on the size and capacity of the battery.

4. **Operating Range:** The operating range refers to the distance over which the jammer can effectively block or interfere with signals.

5. **Types:** There are different types of jammers such as GPS jammers, drone jammers, mobile jammers, and so on. Each with their frequency range and power specifications.

6. **Antenna:** The antenna is a critical part of a jammer and is responsible for receiving and transmitting signals. The type and quality of the antenna can directly impact the effectiveness of the jammer.

7. **Size and Portability:** The size and portability of the jammer determine its ease of use and transportability. Some jammer models are designed to be compact and easy to carry, while others are larger and less portable.

8. **Legal Requirements:** Depending on the country of use, there may be legal regulations regarding the operation and use of jammers. It is important to review these regulations before purchasing or using a jammer.

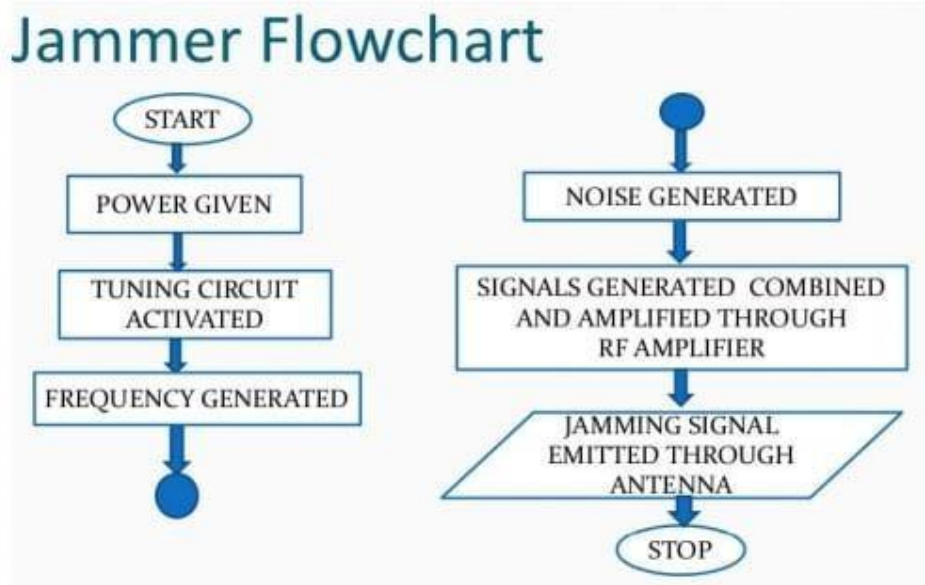


Figure 2: Sequential-mode of operation of the mobile-phone-jammer.

Operating Frequency:

The operating frequency of a jammer refers to the range of radio frequencies it can produce to interfere with communication signals. Jammers are designed to transmit radio signals that are at the same frequency as the signals being transmitted by the target device, such as a mobile phone or GPS receiver. When these signals clash, it can cause interference, making it difficult for the target device to receive or transmit information properly.

The operating frequency of a jammer can vary depending on the type of jammer and the intended target device. For example, a mobile phone jammer may operate at frequencies used by commercial mobile networks, while a GPS jammer would operate at frequencies used by GPS satellites.

It is important to note that the use of jammers is generally illegal, and can cause serious disruptions to public safety and emergency services. It is always recommended to seek legal advice before considering the use of jammers.

II : LITERATURE SURVEY:

A jammer is an electronic device that is used to disrupt or prevent communication signals on a variety of frequencies. Jammers can operate on several types of signals, including GPS, cell phone, Wi-Fi, and radio signals.

There are various types of jammers with different capabilities and applications. Some common types of jammers are:

- GPS jammers: These jammers disrupt the GPS signals used by navigation systems and location-based services.
- Cell phone jammers: These jammers block cell phone signals and can be used in places like movie theaters, schools, and government buildings.
- Wi-Fi jammers: These jammers can disrupt Wi-Fi signals and prevent wireless internet access.
- Radio jammers: These jammers can disrupt radio signals used by walkie-talkies, police radios, and other communication systems.

Jammers can be used for both legal and illegal purposes. In some cases, they are used by law enforcement or military personnel to prevent remote detonation of explosive devices or to disrupt communication among terrorists. However, they are also used by criminals to prevent communication among law enforcement or to disrupt emergency services.

Due to the potential risks associated with jammers, their use is regulated in many countries. It is illegal to use jammers in the United States and most countries without proper authorization.

The effectiveness of jammers varies depending on their type and range. Some jammers can block signals within a few meters, while others can cover large areas of several kilometers. While the use of jammers can be justified in certain situations, it is important to note that they can interfere with emergency services such as police, fire, and ambulance communications. Therefore, it is essential to use them responsibly and follow the local laws and regulations concerning their usage.

III : METHODOLOGY

MULTITONE JAMMER

A multi-tone jammer is a type of electronic countermeasure device that is designed to disrupt or block communication signals over a wide range of frequencies. It works by emitting multiple signals of different frequencies simultaneously, which interfere with the targeted signals and create a "jamming" effect. Multi-tone jamming is an effective method for disrupting a variety of communication systems, including radio, cellular, and GPS signals, as well as Wi-Fi and Bluetooth transmissions. The jamming effect can be tailored to specific frequencies and power levels, making it a versatile tool for blocking different types of signals. Some multi-tone jammers are designed to be frequency agile, meaning they can rapidly switch between different frequencies to keep up with changing communication protocols. This makes them harder to detect and harder for countermeasures to overcome. Although multi-tone jammers can be effective in disrupting communication systems, their use is often restricted or illegal in many jurisdictions, as they can interfere with emergency services and other important communication channels.

JAMMER

The jammer is used to block the communication signals by emitting radio frequency signals of the same frequency as the target signal. This can be done by generating some kind of hurdles for the range of frequency of signals. It will generate very low or no signals for the user. It has many applications like; for defense use, in educational institutes, and in offices during meetings. I have designed this jammer for defense use. In military areas, they use jammers to limit communication during hostage, bomb threats conditions, and military operations.

The benefit of using these jammers is to make secure everyone from any worst situation. Because in these cases the use of the mobile phone can be a source of communication between terrorists or opponents. I have designed the PCB board of jammer that is very flexible to use as it is portable can be carried in the pocket by providing a user-friendly interface. Moreover, a proteus simulation of the design is also available to test its work.

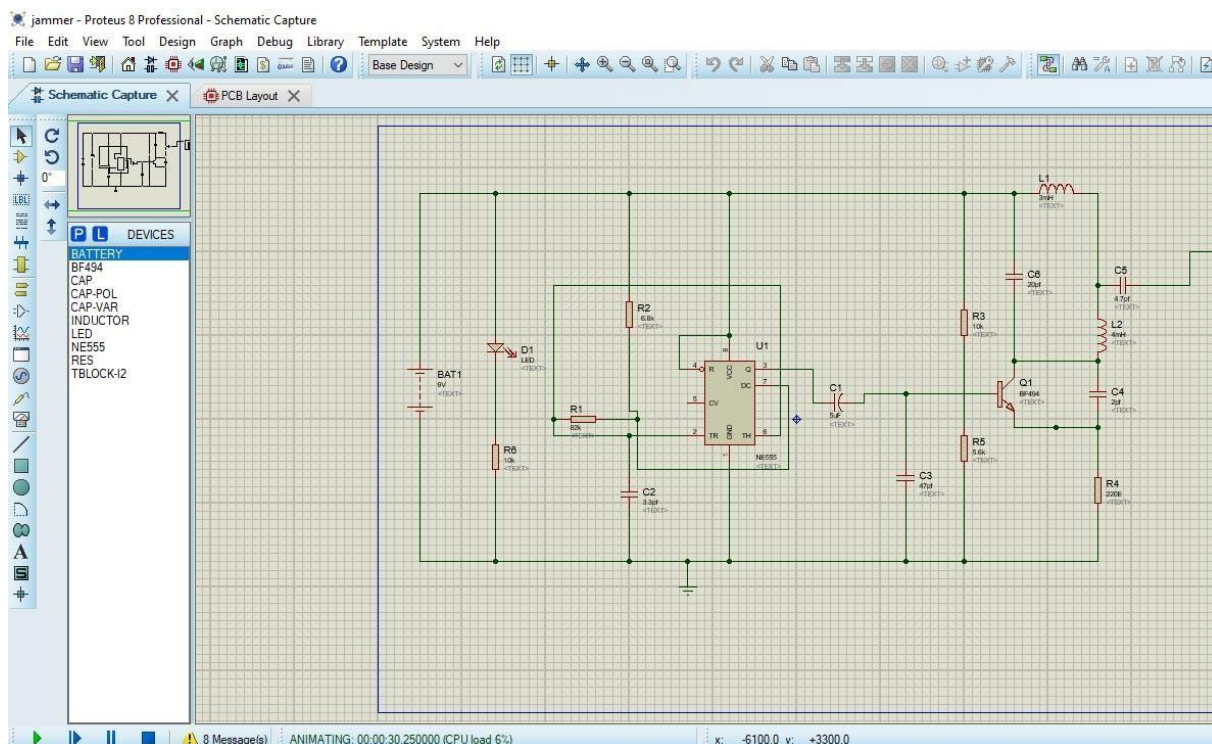
PROTEUS SCHEMATIC DIAGRAM:

In the schematic design, the main component used is the NE555 timer, It is an IC that is used to generate frequency or signals. It has 8 pins; one control and one reset pin. This can be used in delay and oscillator applications.

The output of 555timer will be sent to the amplifier through a capacitor that will block the DC part of the signal and only allow the AC signal to pass. Then this signal will be amplified by the transistor and will be sent to the antenna.

We have implemented the design on Proteus to observe the working of a jammer. Here is the complete design. We have three major subcircuits here which are responsible to jam the signals of devices.

- 1.RF (amplifier,Transistor, capacitor, and resistor)
- 2Voltage Controlled Oscillator (the oscillator that can be controlled by voltage)
- 3Tuning circuit.



IV: MATLAB SIMULATOR

In matlab simulator modeling a jammer object model a broadband jammer the output of jammer is a complex white gussain noise sequence . The modifiable properties of the jammer:

- ERP- Effective radiated power in watts
- Sample per frame source- source of number of samples per frame
- Sample per frame- Number of samples per frame
- Seed source- source of seed for random number generator
- Speed- speed for random number generator

JAMMER ON TARGET ECHO

First, create the required objects, an array a transmitter, a radiator, a target, a jammer, a collector, and a receiver. Additionally, two propagation paths one from the array to the target and back, and the other path from the jammer to the array. Assuming that the array, target, and jammer are stationary the array is located at the global origin,(0,0,0) the target is located at (1000,500,0) and the jammer is located at (2000,2000,100).Determine the direction from the array to the target and jammer. Finally transmit the rectangular pulse waveform to the target, reflect it off the target, and collect the echo at the array. Simultaneously the jammer transmits a jamming signal towards the array the jamming signal and echo are mixed at the receiver generate waveforms. Generate the jamming signal plot the result and compare it with received wave from with and without jamming

V : PROTEUS EMULATOR

In proteus emulator design a jammer. Jammer circuit can be seen in proteus, which may be capable of jamming all sorts signal within the range of 5 to 10 meters. have implemented the design on Proteus to observe the working of a jammer. Here is the complete design. We have three major subcircuits here which are responsible to jam the signals of devices

1.RF amplifier (Transistor, capacitor, and resistor)

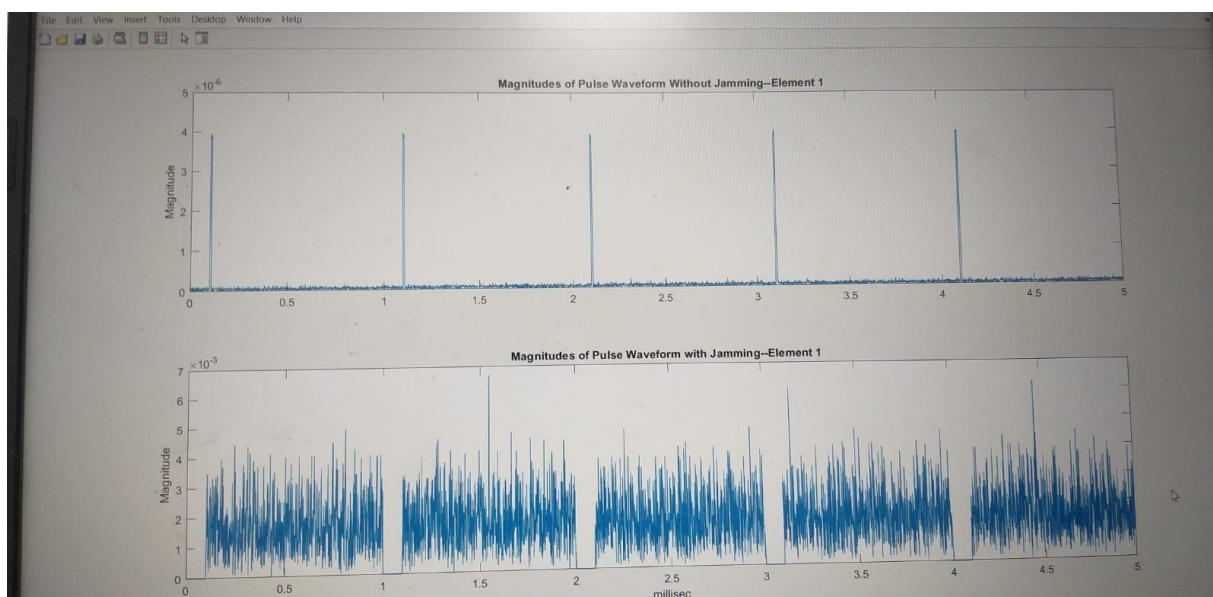
2.Voltage Controlled Oscillator (the oscillator that can be controlled by voltages)

3.Tuning circuit require shorter interconnections and may involve other stability issues. The present design can be used for jamming FM radio stations situated in the within 40 meters radial distance or even higher.

VI : RESULT

MATLAB OUTPUT:

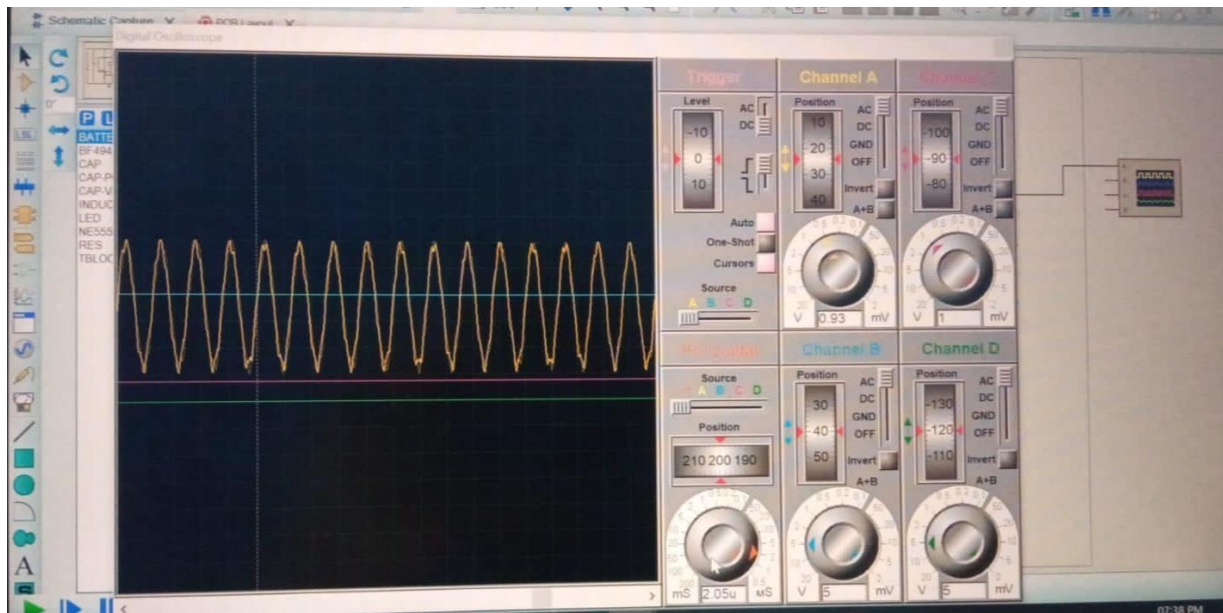
The echo signals from the transmitted rectangular pulse waveform and the jamming signal from the jammer are mixed at the receiver. hence generate waveform with and without jamming.



PROTEUS OUTPUT:

The designed jammer in proteus can be result in loss of connectivity and decreased ability to communicate or use wireless devices. This can also be result in a total loss of signals or decreased signal

strength, making it difficult or impossible for affected devices to function properly.



VII : CONCLUSION:

Multitone jamming is a technique that involves emitting multiple interfering signals on different frequencies to jam a wider range of communication systems. This technique can be an effective way to disrupt multiple types of wireless signals simultaneously, making it ideal for use in situations where multiple wireless systems need to be blocked simultaneously.

One of the main advantages of using a multitone jammer is that it offers a greater level of flexibility than other types of jammers. By emitting signals on multiple frequencies at once, it can effectively block a wide range of devices and systems, including cellphones, Wi-Fi networks, GPS signals, and more.

However, the use of multitone jammers can also have significant drawbacks. For one, they can be more complicated to set up and operate than other types of jammers, requiring more advanced technical knowledge to use effectively. Additionally, because they can block a wide range of signals, they may also disrupt important communication systems, including emergency services and other critical infrastructure.

In conclusion, multitone jamming can be an effective technique for disrupting a wide range of wireless signals simultaneously, but it should be used responsibly and carefully to minimize the risk of disrupting critical communication systems. Ultimately, the use of multitone jamming should be carefully evaluated based on the specific situation and any potential risks associated with its use.

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