Analog Circuits Lab Project
Cell Phone Signal Jammer

Motivation:

Signal jammers are devices that emit radio frequency signals to interfere with or block wireless communications, such as cell phone signals, Wi-Fi signals and others. They have been used for various purposes, such as security, privacy, and public safety. For example, signal jammers can be used in exam halls to prevent candidates from making illegal calls and accessing the internet, or in sensitive areas to prevent remote detonation of explosive devices.

Description:

- The jammer circuit interferes with the reception of RF signals of certain electronics that use similar frequencies and are near the jammer's vicinity. In this circuit, you can adjust the frequency of waves sent out, which can interfere with the signals of many electronics, such as mobile phones, radios, and wireless devices.
- There are three subcircuits in this project
    1. RF Amplifier
        a. The RF amplifier subcircuit is composed of transistors and capacitors. This is used to amplify the signal that is coming from the tuning circuit.
    2. Tuning Circuit
        a. The tuning circuit which is a subcircuit is composed of the trimmer capacitor and the inductors. Thus creates an LC circuit, which acts as a bandpass filter. So this tuning circuit passes frequencies at a narrow range, and it will reject lower and higher frequencies that are outside of the narrow range.
    3. Voltage Controlled Oscillator
        a. The 555 timer in this circuit is the voltage controlled oscillator. The ne555 timer is operating in astable mode. So this acts as an oscillator, and it generates square waves. The voltage output from the timer is connected to the base of the transistor. This jamming circuit sends square waves at a particular frequency (which you can adjust) to interfere with any outside frequency within the same specific range.

Demonstration Plan:

There are two parts in demonstration of the project:

1. In the first part, two mobile phones will be used. The jammer circuit is switched on and the frequency is set. Using one phone we will try to call another phone. This will be unsuccessful.
2. In the second part, we will jamming wifi signals which correspond to 2.4GHz frequency. When we try to browse anything on the internet using wifi, it should fail due to the jammer.

In both parts, the mobiles should work normally when the jammer circuit is turned off.

Components:

- **555 Timer IC (x 1)**
- Breadboard (x 2)
- Jumper wires
- Resistors (3.9k, 6.8k, 82k, 10k, 5.6k, 220 ohms) (x 1 each)
- Ceramic Capacitors (3.3pF , 47pF , 2pF , 4.7pF) (x 1 each)
- Capacitors (4.7 uF) (x 1)
- 24 AWG copper wires (x 1 coil)
- 30pF trimmer (x 1)
- 2N3904 Transistor (x 1)
- 5 volts battery (x 1)

Budget:

- 555 Timer IC , Breadboard jumper wires, 2N3904 transistor and 5 volt battery are available in the HIDES lab .
- Resistors: 3.9k, 6.8k, 82k, 10k, 5.6k, 220 ohms **(Cost / resistor packet: 50 rs)**
- Capacitor: 3.3pF, 47pF, 2pF, 4.7pF, 4.7uF **(Cost/capacitor: 50 rs)**

Component	**Cost / packet**	**Item nos**	**Total**
24 AWG copper wire	215	1	215
Resistors	50	6	300
Capacitor	50	5	250
30pF Trimmer	180	1	180

Total = <u>945 rs</u>

Team:

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