

## Rancangan alat pendeteksi dan pengusir kecoa dan nyamuk berbasis frekuensi = Design of detector and repeler cockroach and mosquito tool base on frequency

Panjaitan, Lidya, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20289621&lokasi=lokal>

---

### Abstrak

[<b>ABSTRAK</b><br>

Kebutuhan manusia akan suatu alat pendukung kesehatan atau pencegah penyakit semakin meningkat seiring dengan berkembangnya teknologi. Banyak upaya yang dilakukan untuk mencegah ataupun mengatasi suatu penyakit yang disebabkan oleh binatang, diantaranya adalah kecoa dan nyamuk. Pada penelitian ini akan dirancang alat pendeteksi dan pengusir binatang dengan menggunakan sensor yaitu sensor ultrasonik yang dilengkapi dengan rangkaian osilator. Sensor ultrasonik ini mampu menangkap sinyal dengan frekuensi 40 kHz. Jangkauan frekuensi tersebut mampu mendeteksi adanya pergerakan kecoa atau nyamuk yang rata-rata rentang frekuensi pendengaran lebih kecil dari 40 kHz. Alat ini tersusun dari rangkaian penguat, filter dan osilator LC Tipe Colpitts. Rangkaian osilator adalah suatu rangkaian elektronik yang dapat menghasilkan osilasi tanpa diberikan sinyal secara eksternal. Sinyal tersebut timbul karena adanya noi se pada setiap komponen yang digunakan. Osilasi tersebut timbul juga karena adanya rangkaian resonator yang menyebabkan sinyal tersebut beresonansi dan amplifier yang menguatkan sinyal tersebut sehingga tidak teredam. Osilator yang digunakan adalah jenis LC dimana rangkaian penyusun resonatornya yaitu induktor dan kapasitor. Dengan mengubah nilai kapasitansi pada resonatornya, maka frekuensi osilasinya akan berubah. Perubahan frekuensi terhadap perubahan nilai komponen kapasitor tersebut akan dijadikan sebagai karakteristik sensor kapasitif Osilator yang digunakan yaitu tipe Colpitts. Dari hasil penelitian, didapat bahwa kecoa dapat dideteksi pada rentang frekuensi  $249,1 \pm 850$  Hz dan pada frekuensi sinyal yang dibangkitkan mulai dari 67,53 kHz dapat mengganggu indera kecoa. Sedangkan untuk nyamuk, didapat bahwa nyamuk dapat dideteksi pada rentang frekuensi  $237,9 \pm 724$  Hz dan diusir pada frekuensi sinyal yang dibangkitkan mulai dari 48,44 kHz.

<hr>

<b>ABSTRACT</b><br>

Human need for a tool to support health or prevention of this disease increases with technological development. Efforts are made to prevent or treat diseases caused by animals, such as the cockroaches and mosquitoes. In this study will be designed detectors and animal repellent by using ultrasonic sensors that are equipped with an oscillator circuit. This ultrasonic sensor is capable of capturing the signal with a frequency of 40 kHz. The frequency range can detect any movement of cockroaches or mosquitoes frequency range of the average hearing loss less than 40 kHz. This device consists of a series of amplifiers, filters and oscillators Colpitts LC type. Oscillator circuit is an electronic circuit that can produce oscillations without external signal is provided. The signal arises because the noise on each component used. These oscillations arise because the series resonator that resonates and causes a signal amplifier that amplifies the signal so it is not damped. Oscillator used is the type of LC in which a series of constituents its resonator are inductors and capacitors. By changing the capacitance value in the resonator, then the oscillation frequency will change. Frequency of changes of changes in component values of capacitors will be used as a characteristic of the

oscillator used capacitive sensors Colpitts type. From the study, found that cockroaches can be detected in the frequency range of 249.1 to 850 Hz and the frequency signal generated from the 67.53 kHz may interfere with the sense of cockroaches. As for mosquitoes, found that mosquitoes can be detected in the frequency range of 237.9 to 724 Hz and expelled at the signal frequency was raised from 48.44 kHz. , Human need for a tool to support health or prevention of this disease increases with technological development. Efforts are made to prevent or treat diseases caused by animals, such as the cockroaches and mosquitoes. In this study will be designed detectors and animal repellent by using ultrasonic sensors that are equipped with an oscillator circuit. This ultrasonic sensor is capable of capturing the signal with a frequency of 40 kHz. The frequency range can detect any movement of cockroaches or mosquitoes frequency range of the average hearing loss less than 40 kHz. This device consists of a series of amplifiers, filters and oscillators Colpitts LC type. Oscillator circuit is an electronic circuit that can produce oscillations without external signal is provided. The signal arises because the noise on each component used. These oscillations arise because the series resonator that resonates and causes a signal amplifier that amplifies the signal so it is not damped. Oscillator used is the type of LC in which a series of constituents its resonator are inductors and capacitors. By changing the capacitance value in the resonator, then the oscillation frequency will change. Frequency of changes of changes in component values of capacitors will be used as a characteristic of the oscillator used capacitive sensors Colpitts type. From the study, found that cockroaches can be detected in the frequency range of 249.1 to 850 Hz and the frequency signal generated from the 67.53 kHz may interfere with the sense of cockroaches. As for mosquitoes, found that mosquitoes can be detected in the frequency range of 237.9 to 724 Hz and expelled at the signal frequency was raised from 48.44 kHz. ]