ABSTRAK

RANCANG BANGUN MODUL PEMBELAJARAN OSILATOR COLPITS CRYSTAL DAN CLAPSS UNTUK FREKUENSI 2-3 MEGAHERTZ

(2025 : xiii + 82 Halaman + 26 Gambar +10 Tabel + 11 Daftar Pustaka)

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Perancangan dan analisa osilator Colpitts, Clapp, dan Kristal dilakukan sebagai bagian dari pengembangan modul praktikum di Laboratorium Teknik Telekomunikasi. Tujuan dari kegiatan ini adalah untuk memahami karakteristik masing-masing jenis osilator dalam menghasilkan sinyal frekuensi tinggi yang stabil dan akurat. Proses perancangan mencakup simulasi, penyusunan rangkaian, pembuatan layout PCB, perakitan perangkat, hingga pengujian menggunakan alat ukur seperti osiloskop dan pengukur frekuensi. Hasil pengujian menunjukkan bahwa osilator Colpitts menghasilkan frekuensi sekitar 2,173 MHz dengan bentuk gelombang sinus yang cukup baik. Osilator Clapp menghasilkan frekuensi sekitar 2,56 MHz dengan kestabilan yang lebih tinggi karena konfigurasi kapasitor tambahannya. Sementara itu, osilator Kristal menghasilkan frekuensi sekitar 3 MHz dengan kestabilan frekuensi tertinggi meskipun bentuk gelombang tidak sepenuhnya sempurna. Keseluruhan pengujian menunjukkan bahwa setiap osilator memiliki karakteristik yang unik dan keunggulan tertentu dalam aplikasinya. Modul ini dapat dijadikan sarana edukatif yang efektif dalam memperkenalkan konsep dasar osilasi kepada mahasiswa.

Kata kunci: *Osilator Colpitts, Osilator Clapp, Osilator Kristal, Frekuensi, Modul Praktik*

ABSTRACT

DESIGN AND DEVELOPMENT OF COLPITTS, CRYSTAL, AND CLAPP OSCILLATOR LEARNING MODULE FOR FREQUENCY OF 2–3 MEGAHERTZ
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The design and analysis of Colpitts, Clapp, and Crystal oscillators were conducted as part of the development of a practical module in the Telecommunication Engineering Laboratory. The objective of this project was to understand the characteristics of each type of oscillator in generating high-frequency signals that are stable and accurate. The design process included simulation, circuit arrangement, PCB layout design, device assembly, and testing using measurement tools such as an oscilloscope and frequency counter. The test results showed that the Colpitts oscillator generated a frequency of approximately 2.173 MHz with a relatively clean sine wave. The Clapp oscillator generated a frequency of about 2.56 MHz with greater stability due to its additional capacitor configuration. Meanwhile, the Crystal oscillator produced a frequency of approximately 3 MHz with the highest frequency stability, although the waveform was not entirely ideal. Overall, the tests demonstrated that each oscillator had unique characteristics and specific advantages in its application. This module serves as an effective educational tool for introducing students to the basic concepts of oscillation.

Keywords: *Colpitts Oscillator, Clapp Oscillator, Crystal Oscillator, Frequency, Practical Module*