UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

MAGNETIC COUPLING FOR CARAVAN AND TRAILER SIGNAL LIGHTS

INTRODUCTION

The project aims to design a magnetic inductive coupling system for caravan and trailer signal lights, implementing contactless power transfer. The current implementation relies on the physical contact of conductors, through a cable and special sockets on the vehicle and the trailer. This connection is problematic as dust and oil interrupt the connection.

DESIGN

A visual representation of how the system is expected to work is shown. The signals, controlled by a user switch are first fed through their respective oscillators. The signal then gets amplified before being transferred across the coils. Next, the signal is filtered and then rectified. Lastly, this output DC voltage is fed into the respective lights.

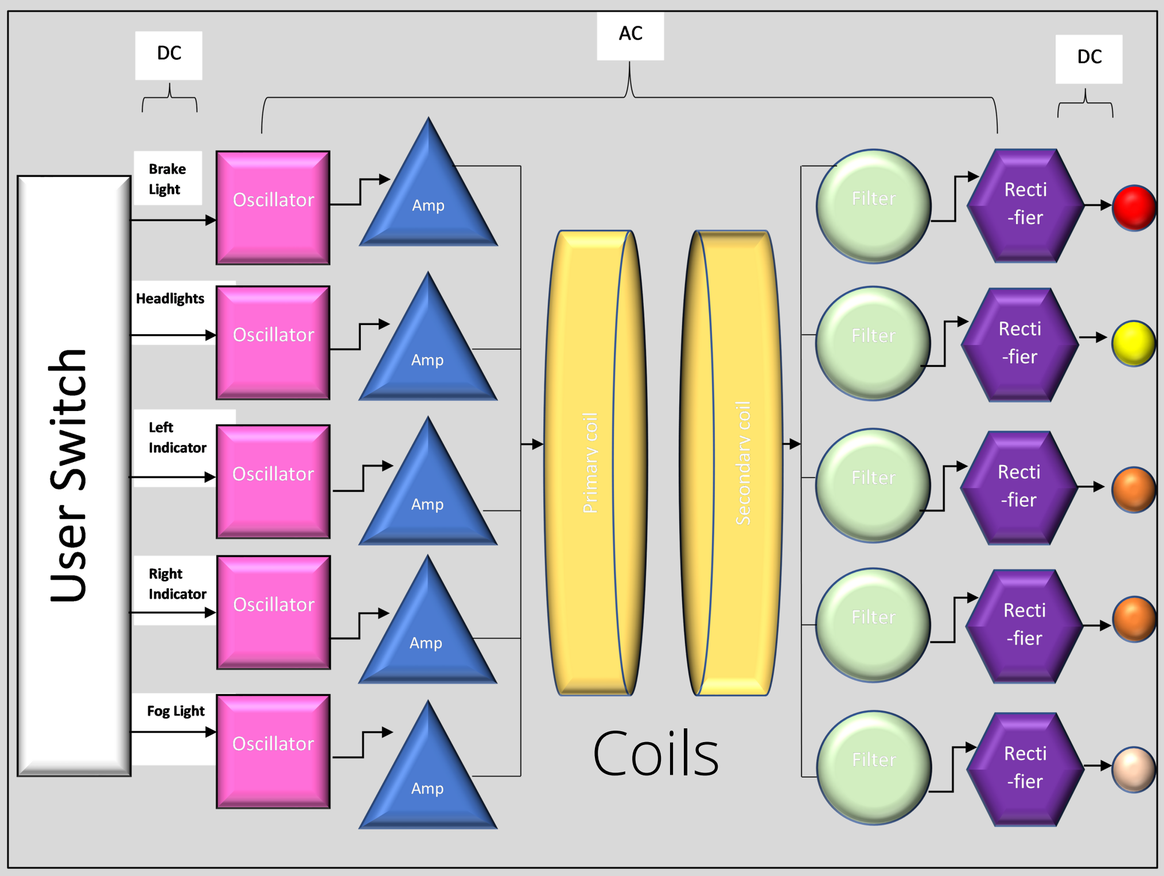

Figure 1: System Design

RESULTS

The results in simulation are promising while there are a couple of shortfalls in the hardware implementation. This is shown in the graph.

The system achieved a coupling factor of 0.47 in simulation with the hardware value being nearly identical.

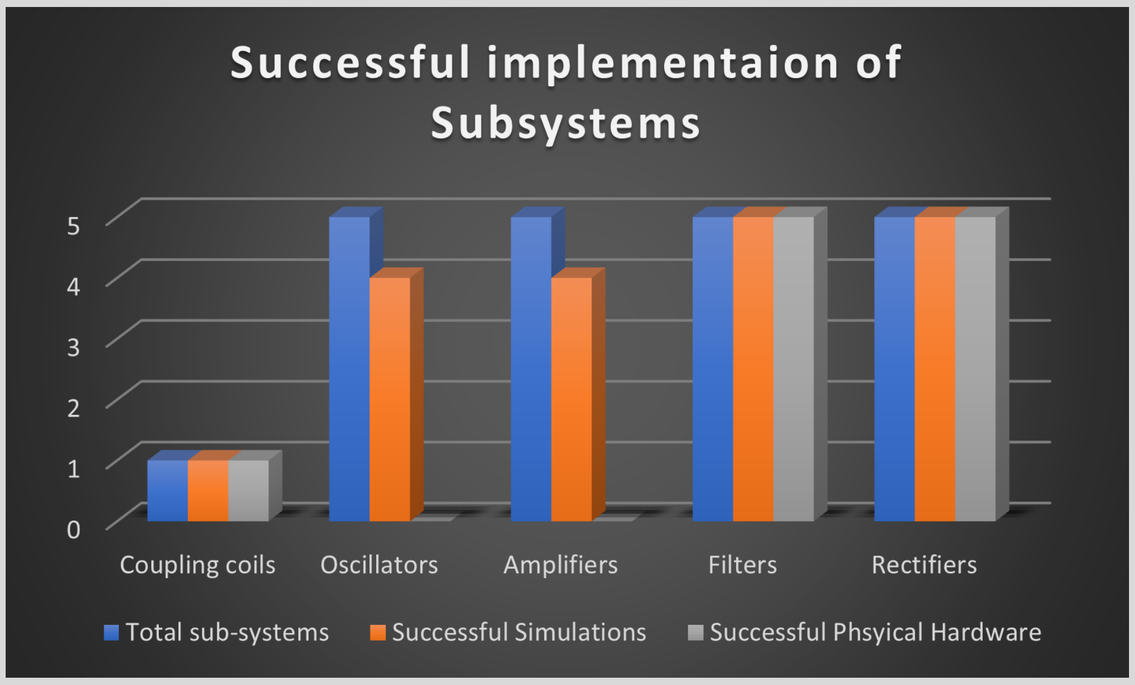

Figure 2: Impentation Results

Further results and a detailed report can be found by scanning the QR code:

CONCLUSION

Various oscillators and filters are designed and implemented, crucial for transferring and distinguishing information. These worked very well in simulation, with a few problems in physical implementation.
Moreover, an efficient coupling is achieved through the design of inductive coils, which are optimised. These coils worked well both in simulation and hardware.
Lastly, basic circuitry such as amplifiers and rectifiers are designed and built.

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