Mechatronics/Electrical Engineering Design

EEE3098/99S

Status Report on EEE3088F Micro-mouse Project

A logo of a university

Description automatically generated

|  |  |
| --- | --- |
| Prepared by: | Duy Nguyen  NGYNAH002 |
| Ronald Walters  WLTRON002 |

## Plagiarism Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another’s work and pretend that it is one’s own.
2. I have used the IEEE convention for citation and referencing. Each contribution to, and quotation in, this report from the work(s) of other people has been attributed, and has been cited and referenced.
3. This report is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as their own work or part thereof.

***A black and white circle with letters

Description automatically generatedSigned by:***

Ronald Walters :

Duy Nguyen :

Contents

[Plagiarism Declaration 2](#_Toc173148917)

[Background on the EEE3088F Micro-mouse Project 4](#_Toc173148918)

[Design of the Micro-mouse 5](#_Toc173148919)

[The Micro-mouse Subsystem: Independent Functionality and System Integration 6](#_Toc173148920)

## Background on the EEE3088F Micro-mouse Project

This report outlines three topics of interest detailing the status of work already completed.

1. The broad scope of the EEE3088F Micro-mouse Project, and the outcomes achieved therein.
2. How the design of two of the Micro-mouse’s four subsystems was conducted and debugged.
3. The independence and interdependence each subsystem has within the Micro-mouse.

Overview

The task of designing and testing **two** of the four compartmentalized subsystems, which comprise the hardware of an autonomous vehicular maze-solving robot was outlined. Colloquially called a micro-mouse, the robot (system) consists of the motherboard, micro-controller, **sensing**, and **power** subsystems.

The power subsystem was tasked with:

* driving two brushed DC motors,
* providing the batteries State Of Charge (SOC) to the micro-controller,
* Charging the Micro-mouses 3.7V LiPo battery from a 5V input to the subsystem,
* Providing the Micro-mouse with the ability to switch off/on through the batteries connection to the system via the power subsystem.

And the sensing subsystem was tasked with:



After gaining familiarity and understanding of the requirements, the first stage of the design process was to conduct research, from which we derived specifications which would enable the designed subsystem to be verified.

Simulation did not form part of this design procedure.

After testable specifications were drawn up for each subsystem, component specific design decisions were taken in conformity with the subsystem budget constraint and availability of said components on the jlcpcb.com/parts webpage.

Thereafter the component’s symbol (.elibz) and footprint (.efoo) files were downloaded from the EasyEDA link on the jlcpcb.com/parts webpage, and imported into KiCAD to construct the production files required for the subsystem’s manufacturing. Additionally, failure management was conducted, and test points were added to aid in debugging the designed subsystems.

After the subsystems were sent off for manufacturing, we were tasked with writing an interim report detailing the design procedure followed in the design of our subsystems.

Once the manufactured sensing and power subsystems arrived, testing and debugging began. This allowed the opportunity to verify the expected operation of the subsystems, while debugging any unforeseen errors which the manufacture made or which we unknowingly provided them with in our production files (gerber files).

Maintaining a record of the tests conducted was a key part in this phase of the process, as this would form the basis of large portion of out final report, the critical analysis of our test results.

Penultimately, there was a demonstration of our subsystems. The power and sensing subsystems were tested using additional testing PCB’s, and not under the conditions as described and designed for in the project brief. The sensing subsystem additionally had to write/modify code enabling the sensing subsystem to be demonstrated.

The conclusion of EEE3088F was a final report detailing the procedural and quantitative approach taken to aid the design, synthesis, and testing of one of the four compartmentalized subsystems comprising the hardware of the Micro-mouse.

EEE3088F Project Achievements

The following achievements were accomplished in the scope of this project.

|  |  |  |
| --- | --- | --- |
| Project Assessment | Ronald Walters | Duy Nguyen |
| Interim Report |  |  |
| Practical Demonstration |  |  |
| Final Report |  |  |
| Final Course Mark |  |  |

Additionally, the following skills were attained over the course of the EEE3088F Micro-mouse Project.

* Competency in KiCAD
* Team-work specifically communication, and perseverance.

## Design of the Micro-mouse

## The Micro-mouse Subsystem: Independent Functionality and System Integration