The Ram Roaster

Team 8

"Where there's a Ram, we'll Roast it!"

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Revision	Description
1.0	Originated document.
1.1	Modified document name to Team_08.doc
1.2	Modified metadata.
1.3	Changed the tagline.
1.4	Changed the product name.
1.5	Edited a team member's name.
1.6	Added system overview blocks.
1.7	Added abbreviations for readers.
1.8	Added system overview descriptions
1.9	Scope added.

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1. Scope

Have you ever needed groceries but didn't want to go out? What if your child is at soccer practice and you didn't feel like going to get them? Well, fret no more! With THE RAM ROASTER you no longer have to leave the comfort of your home. This state-of-the-art vehicle will follow a line of black electrical tape to the destination of your choice. All you have to do is unroll a few miles of black electrical tape and this car will do all those boring tasks for you! THE RAM ROASTER also uses the latest in Global Positioning System technology to navigate to common establishments in order to take care of chores as directed by the user. With two modes of navigation and a top speed of a quarter of a mile per hour, this vehicle will have all of your daily tasks completed… eventually.

2. Abbreviations

CPU – Central Processing Unit: the component of the product that performs all of the number crunching for the car.

GPS – Global Positioning System: the system that allows a device to determine its current location on Earth.

LED – Light Emitting Diode: a circuit component that emits light, which is used for providing a user interface.

LCD – Liquid Crystal Display: a component that outputs useful information to the user.

QSK – Quick Start Kit: the development environment that our product is built with.

USB – Universal Serial Bus: the protocol and hardware for interfacing with the vehicle's onboard computer.

3. System Overview

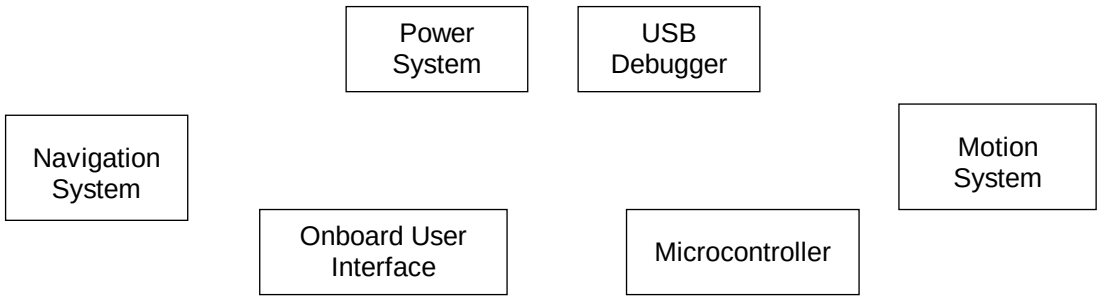

Figure 1 System Overview

3.1. Onboard User Interface

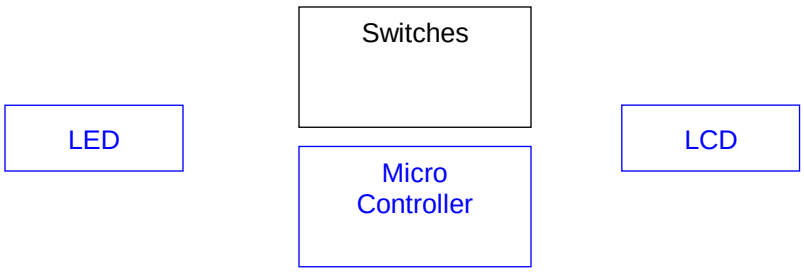

Figure 2 Onboard User Interface

The user can interact with the vehicle through the buttons and onboard dial. This allows the user to adjust the vehicle's settings without the use of a computer. The user then, receives feedback from the LCD screen and the use of LEDs.

3.2. USB Debugger

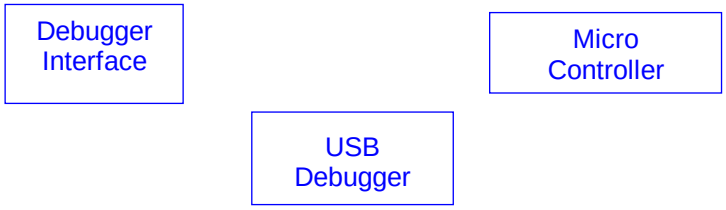

Figure 3 USB Debugger Overview

The USB debugger allows the vehicle to be connected to a computer so that new information can be transferred to the onboard computer. It also allows an advanced user to troubleshoot the current code in the onboard computer.

3.3. Microcontroller

Figure 4 Microcontroller Overview

The Microcontroller is the heart of the system. It processes inputs from: the users, sensors, and the GPS unit. It uses these inputs to cause the vehicle to follow lines or navigate through GPS waypoints.

3.4. Navigation System

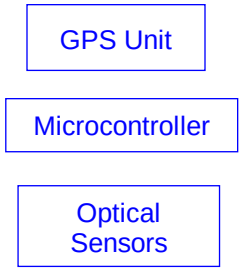

Figure 5 Navigation System Overview

The navigation system provides the vehicle with information for travelling. The navigation system comprises a GPS Unit and optical sensors.

3.4.1. GPS Unit

The GPS unit provides the vehicle with its current location on Earth, which allows it to navigate to a desired location.

3.4.2. Optical Sensors

The optical sensors are used by the vehicle to detect black lines, which it then follows.

3.5. Motion System

Figure 6 Navigation System Overview

The motion system is comprised of the motors and their controllers. This is the heart of what moves the vehicle from place to place.

3.5.1. Motors

The motors are connected to the vehicles wheels which are controlled by the microcontroller and the motor controller system.

3.5.2. Motor Controller System

The motor controller system contains the circuitry use to activate the motors in either direction at any number of speeds.

3.6. Power System

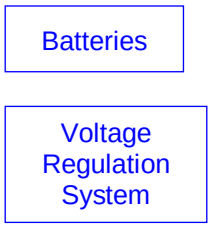

Figure 7 Power System Overview

3.6.1. Batteries

The vehicle runs uses 4 AA batteries, which provide the requisite raw power to the microcontroller, motors, and other devices connected to the vehicle.

3.6.2. Voltage Regulation System

The voltage regulation system takes the raw batteries input and controls it to a level which the microcontroller and other circuitry can comfortably use.