**EEL 4924 Design II**

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**Project Abstract**

**Title:** R2-D2 RC Robot

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**Abstract:**

Our project is to build the “Star Wars R2-D2” using RC Robot and Controller. The objective is to build a fun robot that people can play with that will behave like the robot from the Star Wars series. The roles for the robot and controller are described below.

For the controller, we must choose between two options of implementation. The first option is a physical controller with keyboard using XBee. This controller will have a joystick to control the robot’s movement. Additionally, it will have several buttons/controls to operate different functions of the robot, such as audio output, shooting “Nerf-Gun” bullets, and other potential tasks. Finally, the keyboard will allow for text-to-speech operation for communication. The second option is a glove controller with combination of accelerometer, gyroscope, and/or flex sensors. With this implementation, each finger’s flex sensor will control a different operation as described in the previous implementation, but this would exclude the text-to-speech commands because there would be no input to drive that output. This method simulates controlling the R2-D2 robot with “The Force” as the Jedi’s do in the Star Wars movies. Both implementations will be battery operated and will have battery recharge circuits.

For the robot, a microcontroller will drive servo/stepper motors to control the robot’s movement. The control will be received via XBee from the controller for motion. The microcontroller will also drive the other operations of the robot, based on the data communication from the XBee module, such as weapon control, text-to-speech audio, and other sound outputs from the robot. For aesthetics, the R2-D2 robot will have a thermistor circuit which will control the microcontroller to display different colors on RGB LEDs. For example, the LEDs will default to “Blue”, just like the original R2-D2, but will adjust to “Red” for temperatures that exceed a predefined threshold. This robot will be battery powered, and it will use the same battery recharge circuit as the controller.

**Introduction:**

A "Star Wars R2-D2" would be useful in the domains of remote-controlled devices and vehicles.  Our specific robot needs to be responsive to the user's inputs and will be able to perform different operations, including outputting sound, displaying lights, moving, and shooting weapons.  Our goal in designing this project is to create a remote controlled, interactive robot that a person can operate for fun that will be reminiscent of the “R2-D2” Robot from the Star Wars series.

**Technical Objectives:**

- Controller needs to receive inputs via sensors. Sensors may include flex sensors, joystick (analog), keyboard, buttons, triggers, etc

- Controller needs to make decisions from sensor inputs and transmit instructions via XBee

- Receiver on RC car needs to drive instructions to microprocessor via serial communication

- Microprocessor may receive instructions to output sound (potentially including Star Wars music), drive motors, shoot weapons

- Need batteries for both the controller and the car