Project 2

Project 2 Objectives

At the end of this project, you should be able to:

- read analog information through the Atmel Analog-to-Digital converter,
- using a sensor model, interpret analog voltages in terms of sensed quantities, and
- convey information about sensors using a set of LEDs and using serial output.

Part 1: Circuit

- Add a second switch
- Connect the rate gyro
- Connect the distance sensors

Part 2: Rate Gyro

Must implement:

- int16_t get_rotation_rate(void)
  - Returns rate in 10ths of a degree per second (left-handed coordinate system)
  - Range: -300 to 300 deg/sec for (most groups)
- void display_rotation_rate(int16_t rate)
  - Display using the 10 LED bar

Part 2: Rate Gyro II

Must implement:

- Main function: grow your while(1) loop:
  - Get the heading, rotation rate and distances
  - Display one of: rotation rate, left distance, right distance (depending on switch configuration) using LEDs
  - Write sensor data to serial port

Part 3: Distance Sensors

Must implement:

- uint16_t get_distance(DistanceSide side)
  - side == LEFT or side == RIGHT
  - Return distance in mm
  - Must carefully convert analog signal into distance
- void display_distance(uint16_t dist)
  - Changes the 10 LEDs to indicate distance

Part 4: Hovercraft

Mount:

- Batteries
- Forward thrust fans
- Breadboard
- Distance sensors

Demonstration/Presentation

- Same model as project 1