Lab 3 Report: Remote Motor Control with Feedback

Lab Goals:

* Receive and interpret wireless data packets
* Learn about quadrature rotary encoders
* Configure GPIO pin(s) as interrupts
* Derive relationship between encoder outputs and distance traveled

Steps to Accomplish Goals:

1. Loaded pre-compiled binary image on the ECE353 controller board to send data to the ECE315 robot. Also, supplied the controller board with two unique IDs to allow the controller board to communicate with only our robot
2. Installed given libraries
3. Used the data packets received from the ECE353 controller and the PWM peripheral drivers from lab 2 to control the direction and speed of the robot
4. Configured two output channels for each encoder
   1. PF0 <- ENCODER\_LEFT\_A
   2. PF1 <- ENCODER\_LEFT\_B
   3. PC5 <- ENCODER\_RIGHT\_A
   4. PC6 <- ENCODER\_RIGHT\_B
5. Configured external interrupts on GPIOF and GPIOC (GPIO pins connected to the encoder channels)
6. Using the encoder that provided the most consistent results, calculated the number of pulses / inch using the formula: Number of pulses / inch = (Number of pulses / known distance) \* (known distance / inch)
7. Wrote a subroutine in encoders.c that computes the number of pulses required to accumulate for a given distance

Problems Faced:

* No problems faced!

Ready Reference:

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| --- | --- | --- | --- | --- |
| Trial 1 – 10ft | Trial 2 – 10ft | Trial 3 – 10ft | Trial 4 – 10ft | Trial 5 – 10ft |
| LA – 2770.90 | LA – 2727.27 | LA – 2749.1 | LA – 2814.55 | LA – 2773.09 |
| LB – 5541.82 | LB – 5432.73 | LB – 5498.2 | LB - 5629.1 | LB – 5541.82 |
| RA – 3490.9 | RA – 3512.73 | RA – 3447.3 | RA – 3534.54 | RA – 3506.18 |
| RB – 3490.9 | RB – 3512.73 | RB – 3436.4 | RB – 3534.55 | RB – 3504 |