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**Motor Testing:**

This week we focused on testing all four motors with the ESC (electronic speed controls) and timing all fours motors so that they would start at the same time. Since this is for only testing proposes we used a potentiometer to control the range of speed instead of our sensors. As we increased the resistance of the potentiometer the speed of the motor also increases. The ESC we are using is a four in one, so each motor has its own channel. Each motor is connected to one channel on the ESC and then that channel is connected to a PWM output on our microcontroller. Sine they’re four motors we are using four PWM signals on the microcontroller.

All four of the PWM signals are then connected to one potentiometer. This one potentiometer controls the speed for all four motors. The four motors are powered by our battery pack and we supply an outside voltage of 5 volts instead of getting power from the microcontroller. The next part we then did was to setup a simple program that would let us test our motors with a potentiometer.

**Block Diagram:**

**Program:**

As you can see in the program we first declared each motor and set the potentiometer on A0. After declaring each motor we then set it to PWM output pins. The pins that we used were 3, 6, 9, & 10 with a delay of one microsecond. We set the initial value for each motor to 0 and gave it a delay of 1000 microseconds. We then used the map function to control the range of our motor. Our values are from 0 to 180 and then we set the output of the mapped values to be printed out.

**Specifications:**

* 103 Potentiometer: range is from 1 to 10Kohms.
* Brushless Motor: range is from 0 to 180 degrees.
* Pins 3, 6, 9, & 10 are all PWM output signals.