

Introduction

The **Digilent Motor Robot Kit (MRK)** provides the perfect starting point to robotics, and has the power to be used for advanced designs and applications. **Pulse-Width-Modulation(PWM)** was a key idea used in this project to control motors. A duty cycle specifies how long the motor is on during a given period of time(i.e. On/Off cycle).

As expressed by:
$$\%Duty\ Cycle = \frac{On\ Time}{On\ Time + Off\ Time}$$

Results

From C coding

```

/* Prints Hello World */
#include <stdio.h>

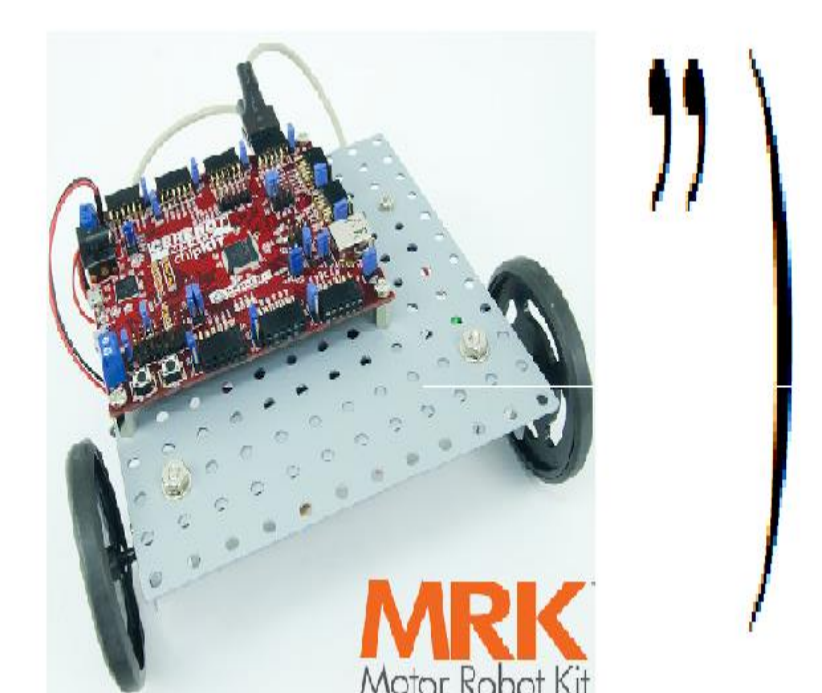
int main(void) {
    printf("Hello World!");
    return 0;
}

```

to PWM

to `printf(" ")`

- Hello, World!
- Variables and Types
- Arrays
- Strings
- For loops
- While loops
- Functions

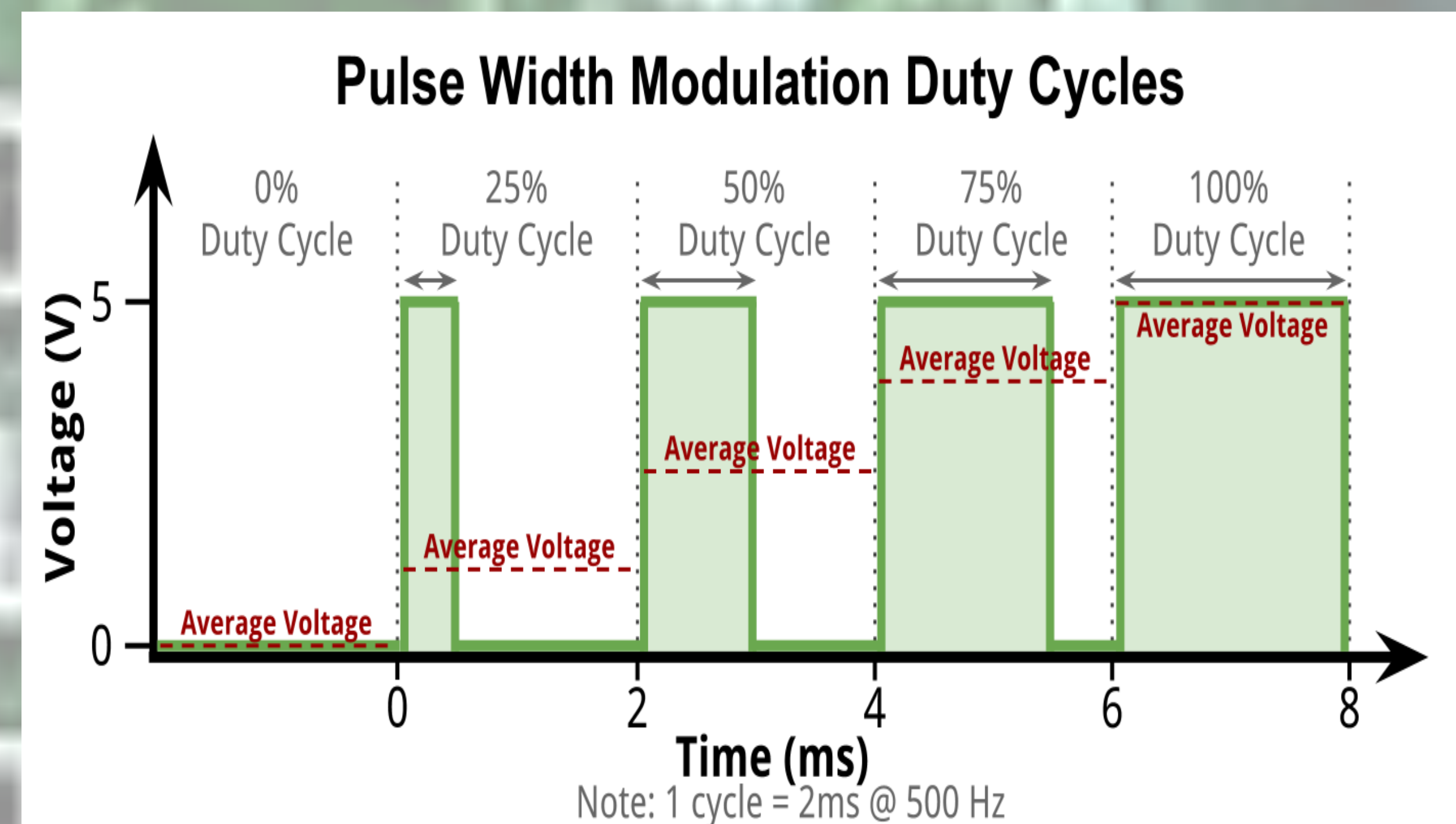


Future Plans

Including some of these Peripheral Modules would expand the robot's capabilities:

- PmodGPS - GPS Receiver
- PmodALS - Ambient Light Sensor
- PmodCLS - Character LCD w/ serial interface
- PmodPS2 - Keyboard/mouse connector
- PmodI2S - Stereo Audio Output
- PmodJSTK - Two axis joystick
- PmodWiFi - 802.11b Wi-Fi Interface
- PmodMIC - Microphone w/ digital interface
- PmodTMP3 - Temperature Sensor

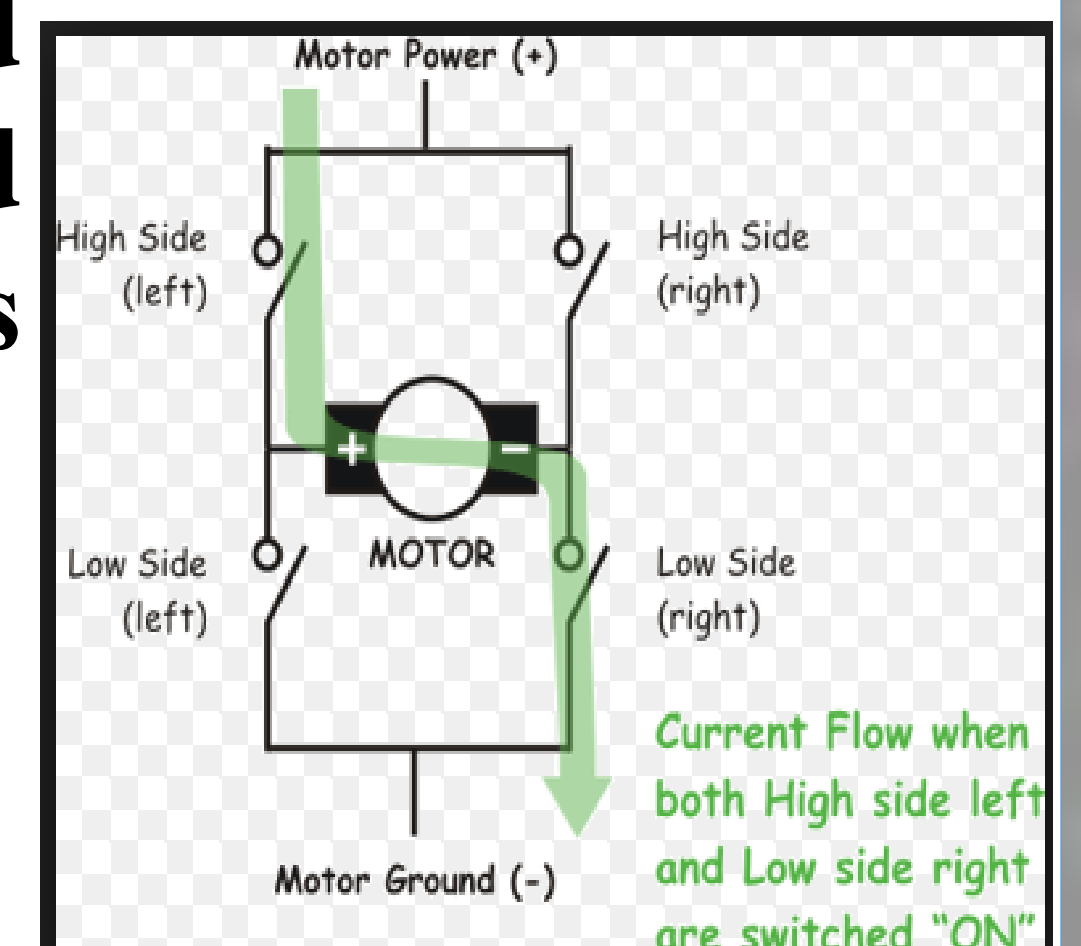
Method



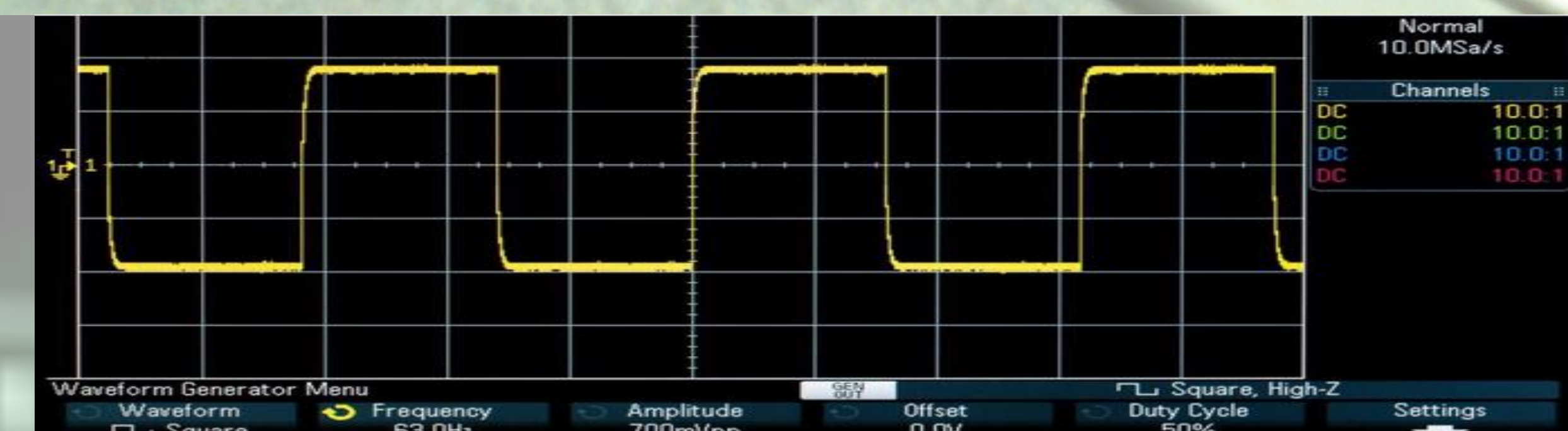
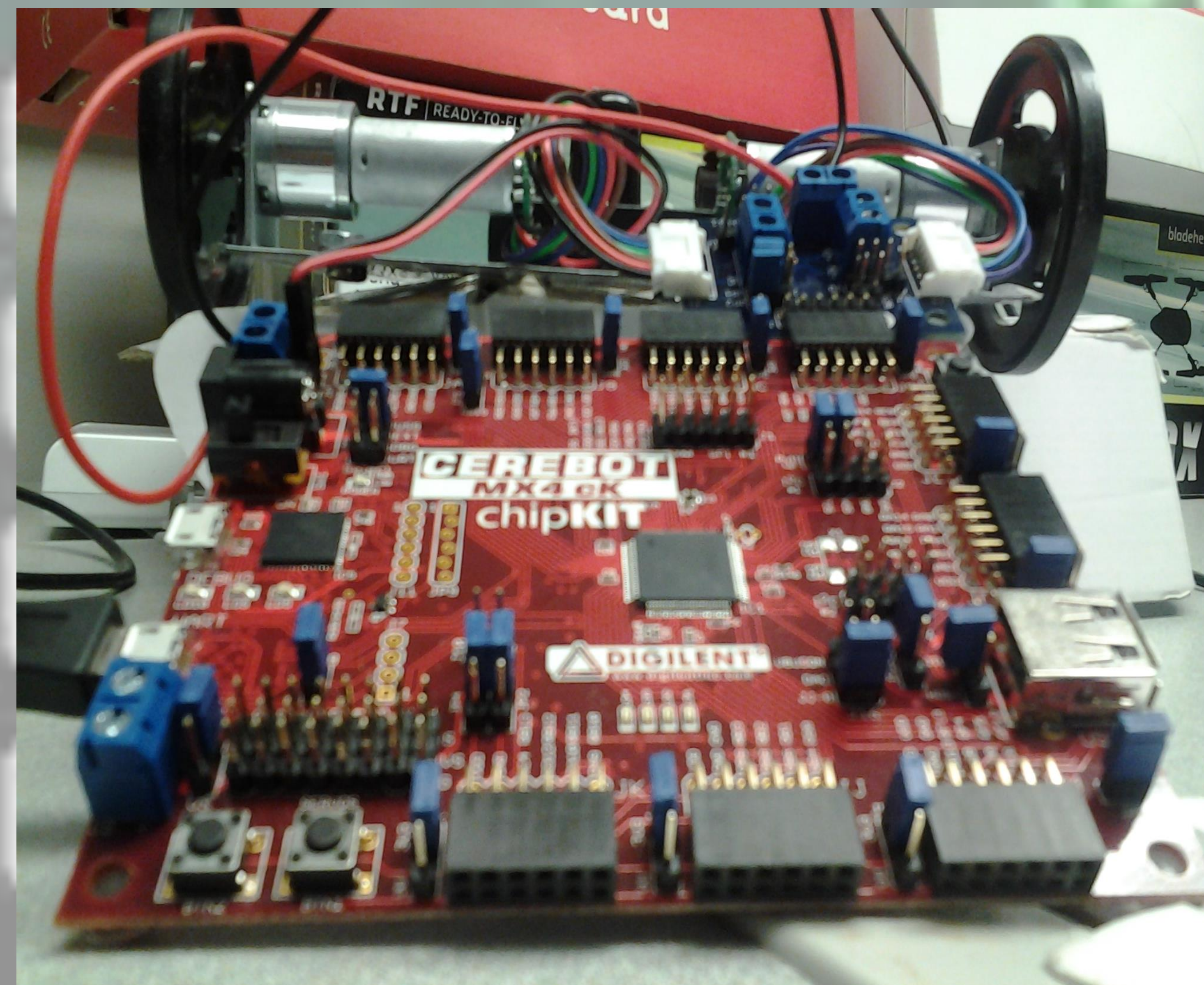
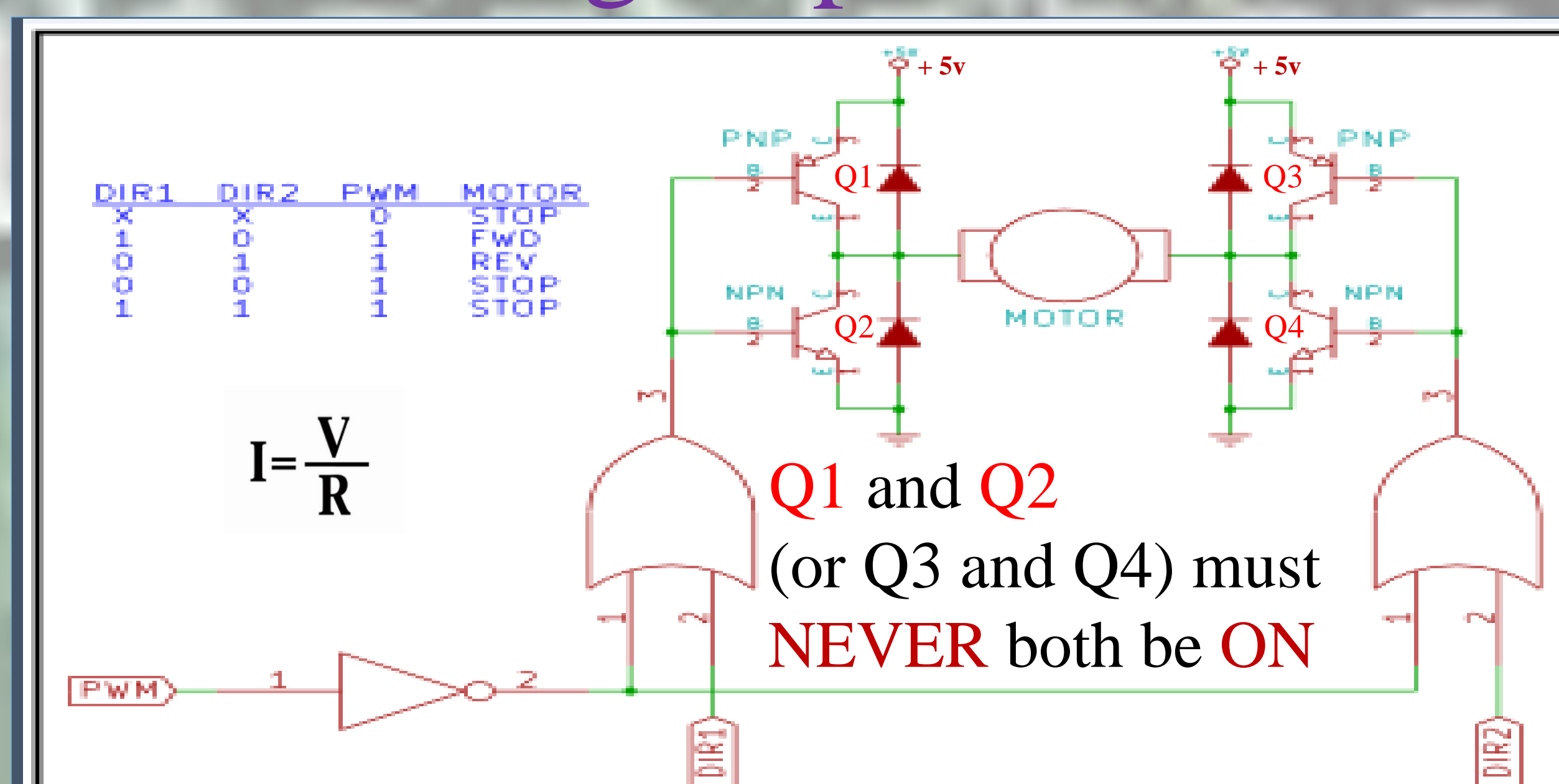
Conclusion

Pulse Width Modulation is a powerful technique for controlling analog circuits using microprocessor digital outputs.

Using a PWM controlled Dual H-bridge, the speed and direction of a robot's motor was controlled.



H-bridge Operation



Acknowledgement

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