

# Joystick Car

Custom Project Final Report

Winter 2018

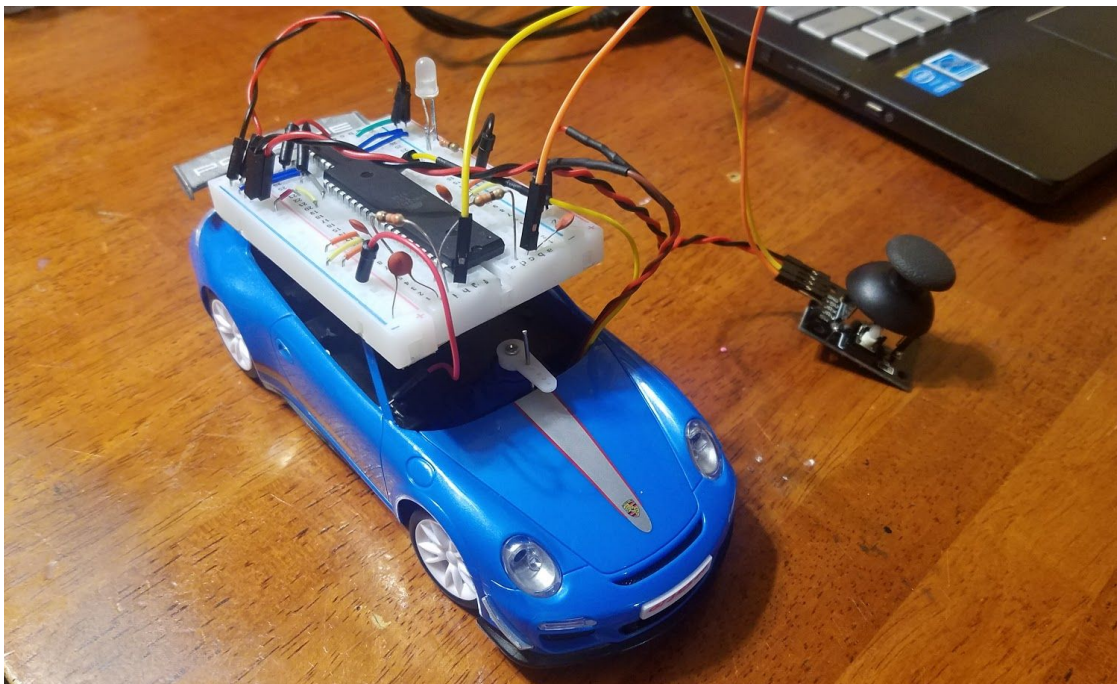
Hector Barajas

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# Introduction

The joystick controlled car has two forms of control: steering and acceleration. Moving the joystick up and down makes the car go forward and backwards. Moving the joystick left and right controls the wheel angle so that the car can move left and right. The analog output from the joystick is converted to a digital value which is used for both the turning and acceleration.

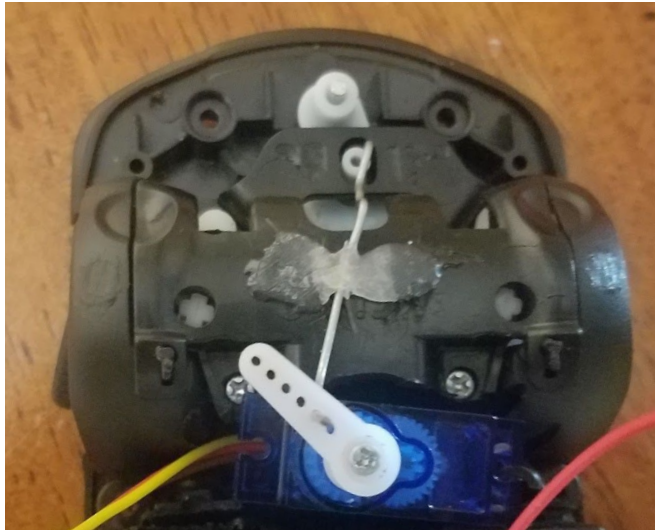


## Hardware

### Parts List

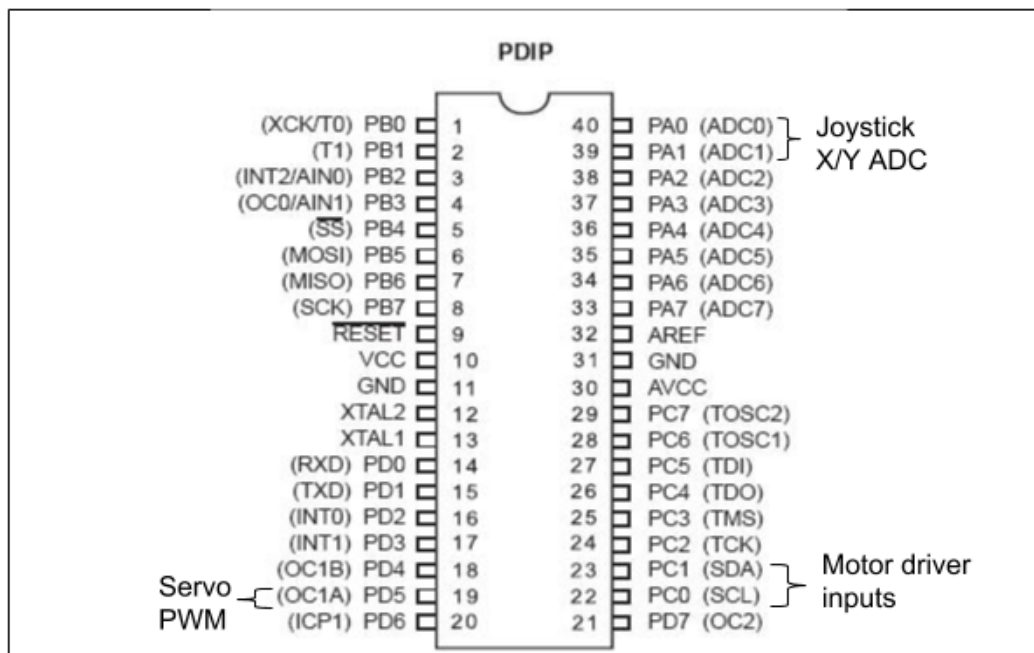
The hardware that was used in this design is listed below. The equipment that was not taught in this course has been bolded.

- ATmega1284p microcontroller
- Toy rc car with main circuitry removed as base
- **Joystick**
- **9g Micro Servo** + wire connected to steering rack
- **DC motor with L293D Motor Driver integrated circuit**

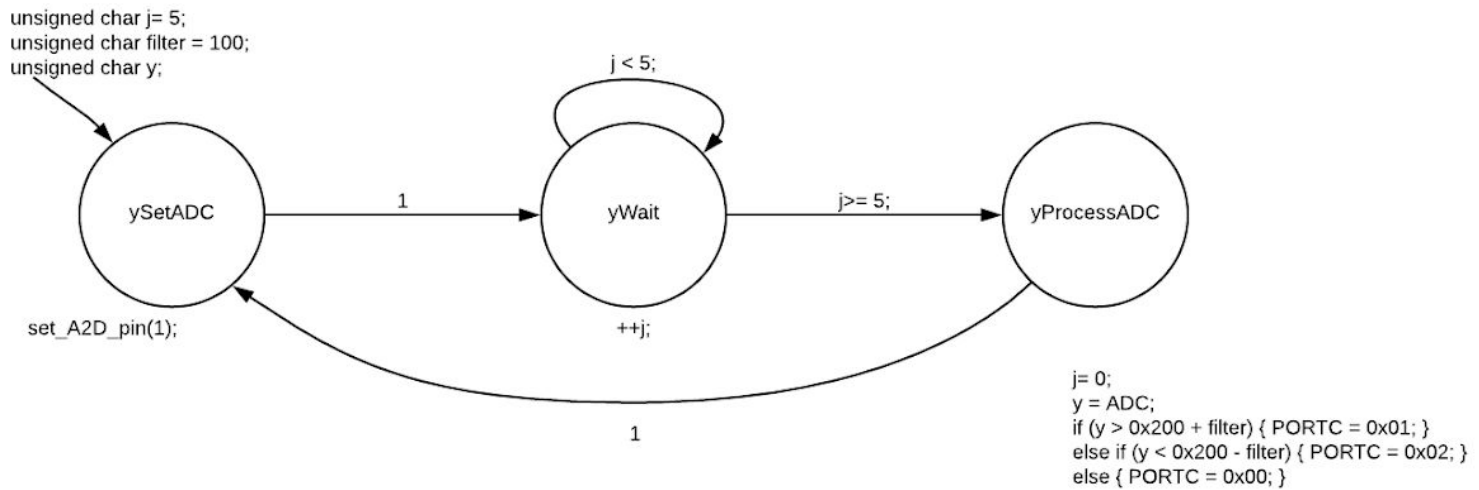
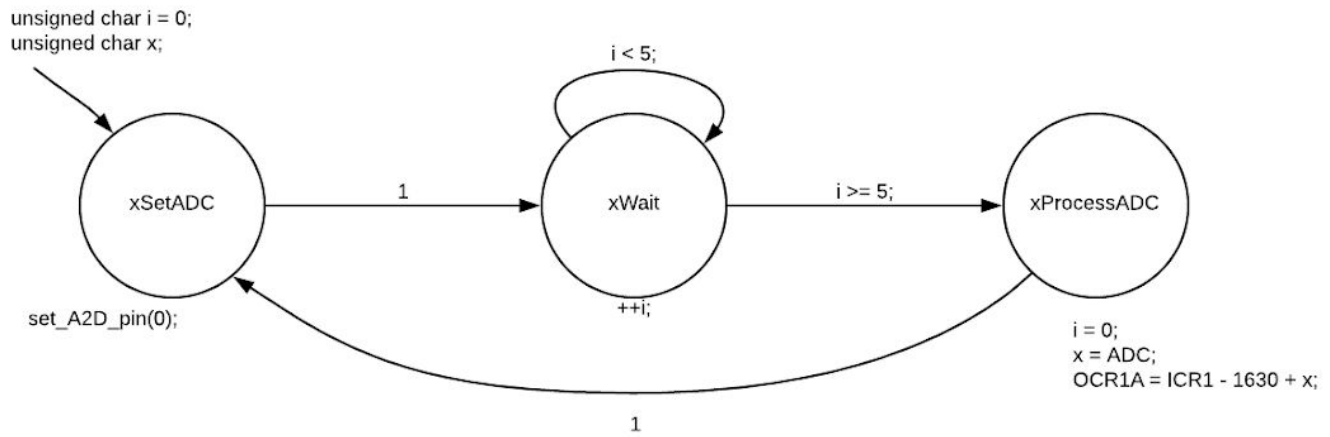


Depicted: servo turned left, moves wire which pivots over hot glue pad, which turns the steering rack.

## Pinout



# Software



# Complexities

## Completed Complexities:

- Integrating and calibrating the joystick
- Using a dc motor with a motor driver for forward/backward motion
- integrating/calibrating a servo for left/right steering

## Incomplete complexities:

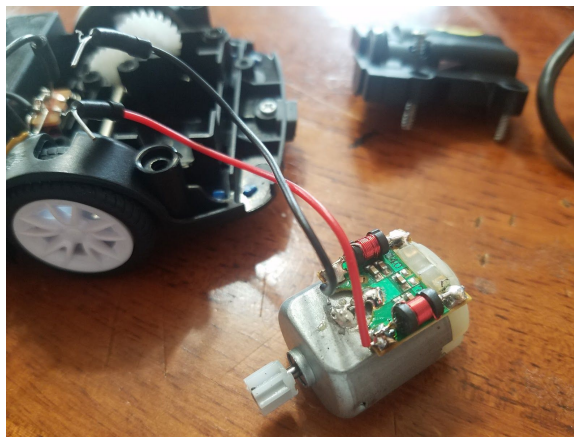
- Wireless RF communication between microcontrollers

## Youtube Link

Find a video demo here: [https://youtu.be/JWV\\_di2TPOE](https://youtu.be/JWV_di2TPOE)

## Known Bugs and Shortcomings

Holding the joystick back, releasing, the holding it back again sometimes fails to move the car backward. The motor that came with the car has a small circuit attached. The original, main circuit (which was removed) probably somehow interacted with this smaller circuit which would prevent this problem. My first step to fixing the problem would have to be purchasing a new motor without this extra circuit, with a gear the fits in the original gear box.



Motor with circuit attached.

## Future work

I plan on working on this project because I know that I was close to achieving full wireless control of the car. Despite ~20 hours of trying to adapt a library for the nRF24L01, RF wireless transceiver into the project, I was unable to and I plan on continuing to work on implementing this feature so that the car would actually be an RC car rather than a joystick controlled car.

Because I was trying to get the transceivers to work, I also missed the opportunity to integrate variable speed. Currently the car either goes forward, backward, or it doesn't move at all. Other future features that I may add may not be as challenging, things like a speaker to sound a horn or a switch to turn on LED headlights.

## References

- Controlling a Hobby Servo using an Arduino, NewbieHack.com.  
<https://www.newbiehack.com/MicrocontrollerControlAHobbyServo.aspx>
  - Short tutorial on how to use pulse width modulation and waveform generation modes for a servo.
- CS122A Joystick Lab