# EE 190 Final Project – Micromouse Controller PCB

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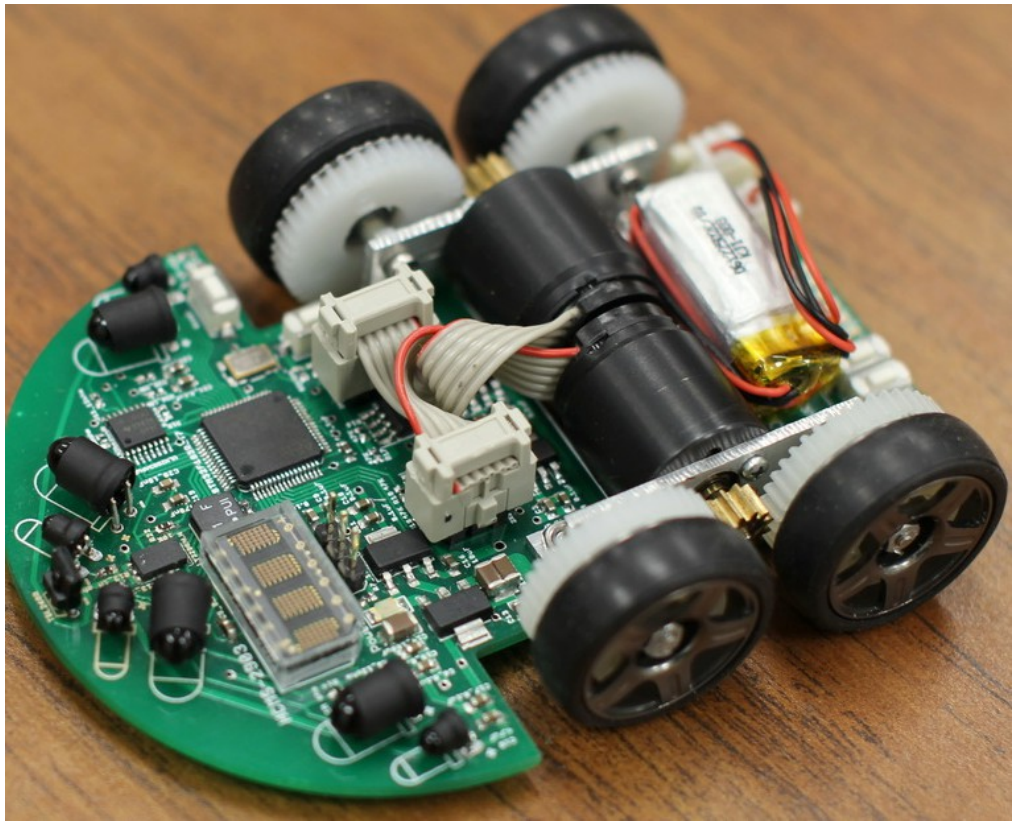
# Motivation

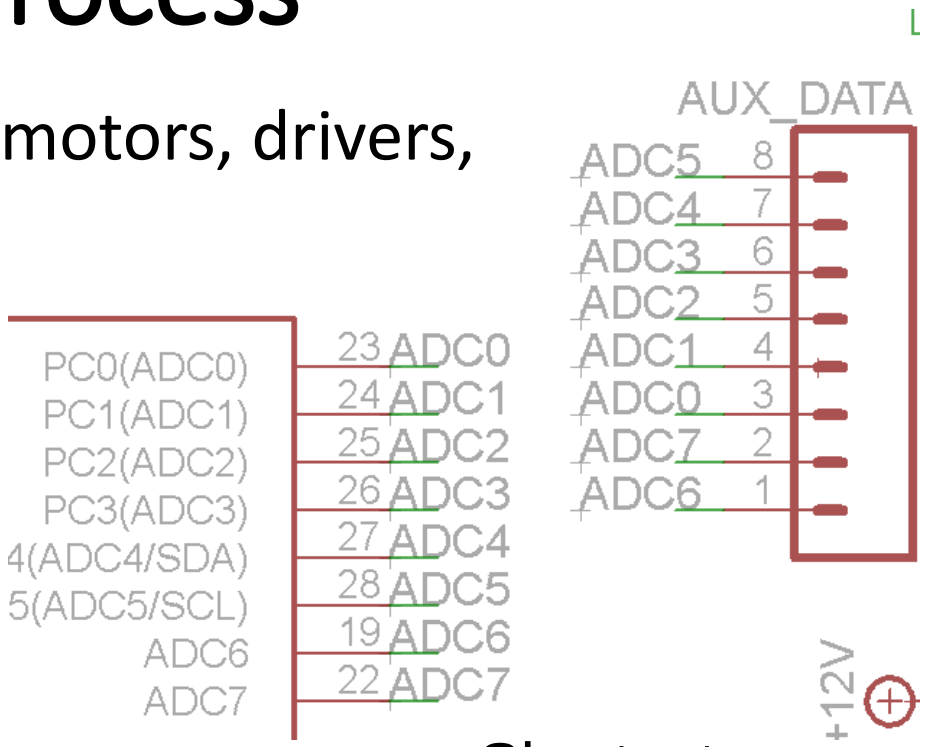
- Build a general-use micromouse controller from the ground up
  - Design allows for many different configurations
- Create a practical PCB
- Apply skills learned in the course throughout the quarter
  - Design schematic for particular requirements
  - Connect a large number of pins in an efficient manner



The first Micromouse...
that showed up on Google

# Schematic Design Process

- Figure out what parts would be compatible with motors, drivers, microcontroller, etc.
  - Requirements consisted of:
    - 2 motors
    - As many Analog or Digital
    - I/O ports as possible



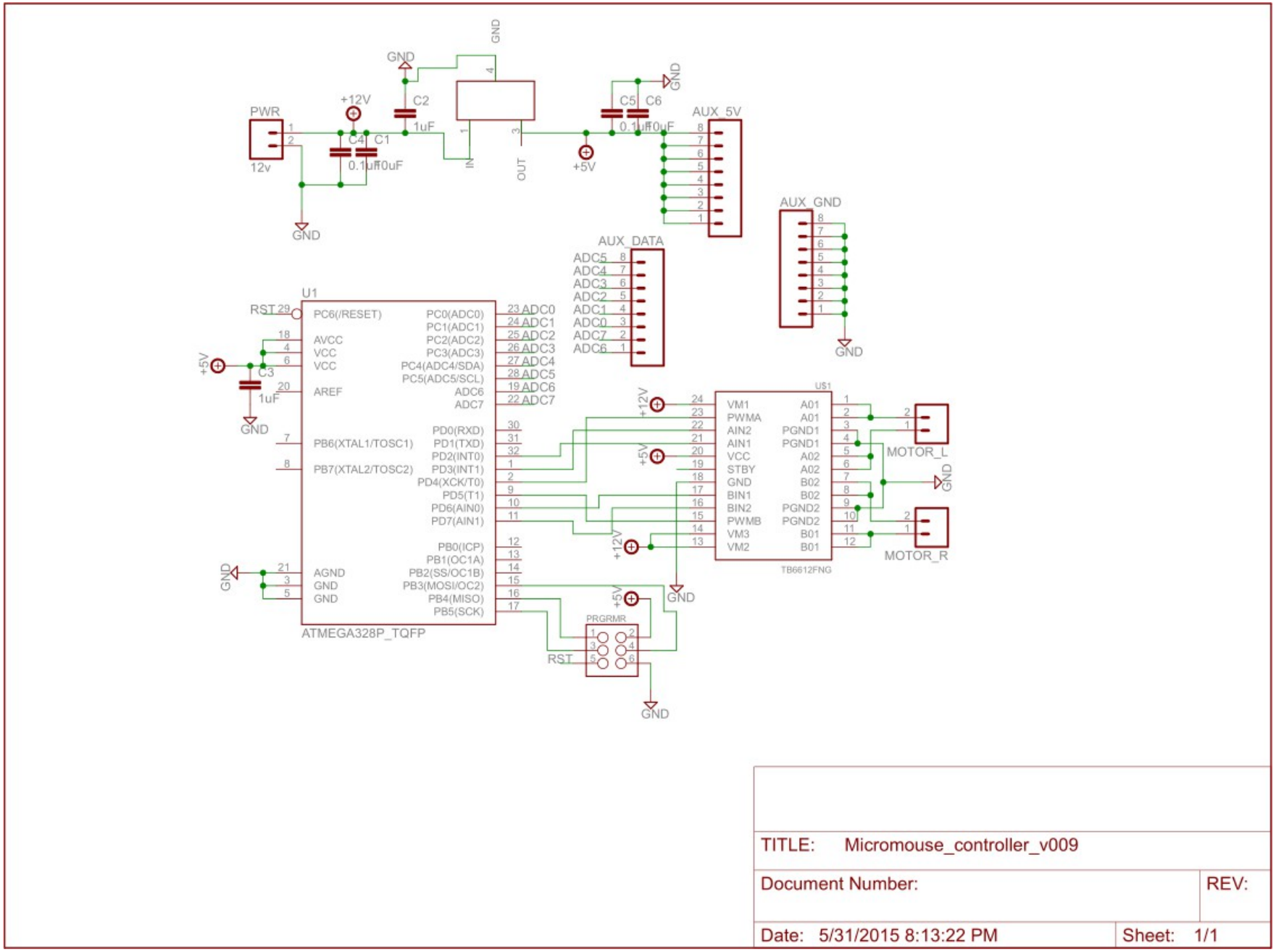

Shortcuts

- Draft schematic
  - Follow manufacturer datasheets for pinouts, voltages, etc.
- Run DRC
- Revise!

# Schematic Design

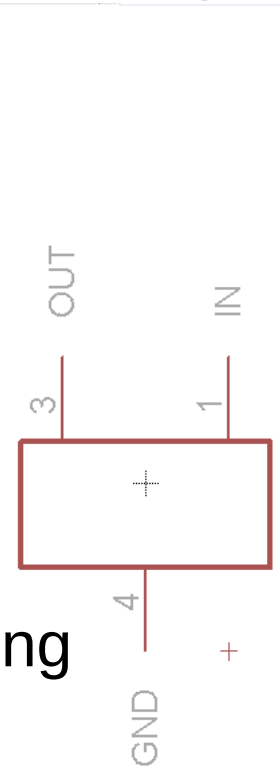
3 Primary Components:

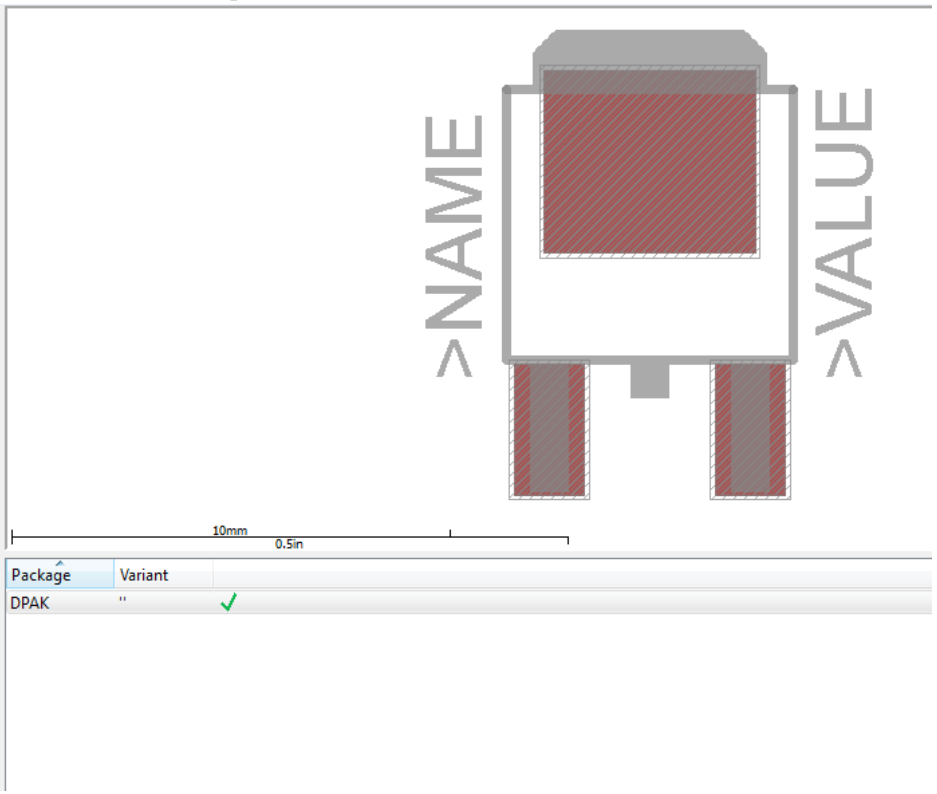
- Power System
- Microcontroller
- Motor Driver



# Schematic Design Difficulties

- Learning how each component works
- Constant referral to manufacturer datasheets
- The selected voltage regulator did not have an EAGLE component
  - Used ref_package.lbr to find package for component and created own

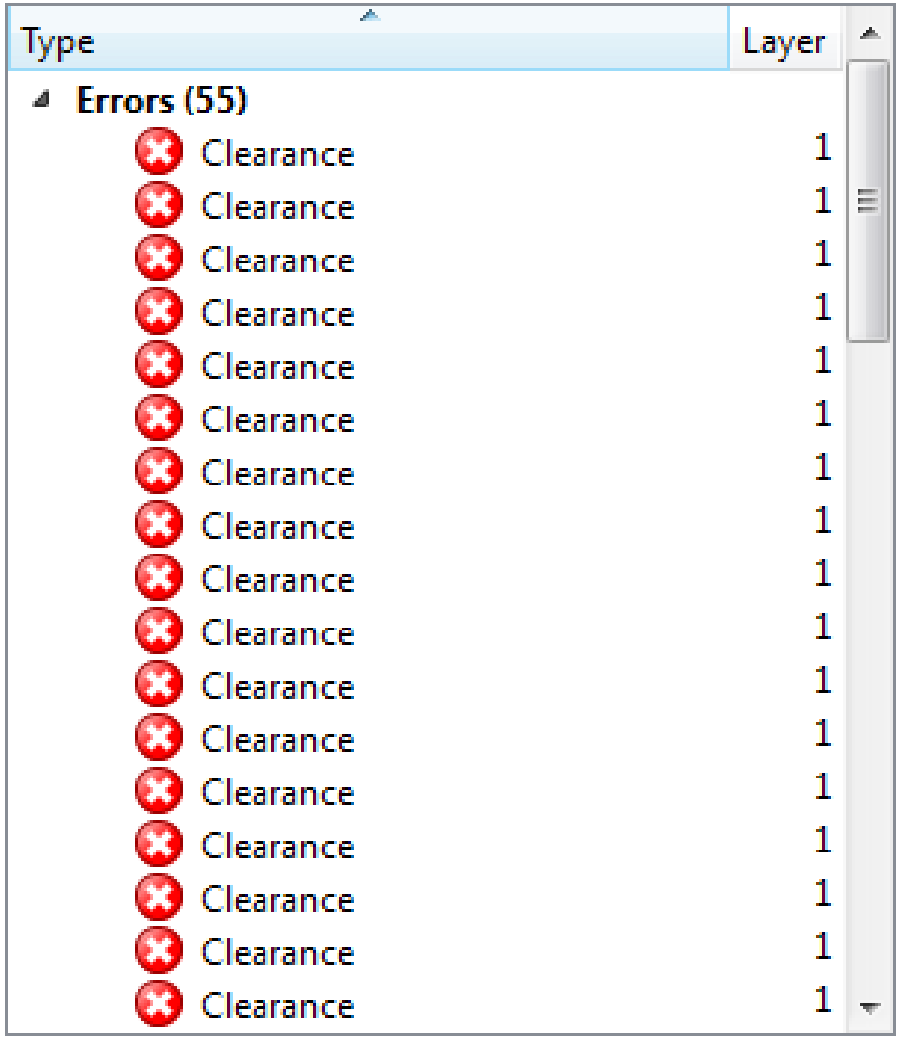



Custom component using DPAK package

# Board Design Process

- Create board from schematic
  - Position components for various needs:
    - Ease of routing
    - Efficient use of board space
    - As few vias as possible
- Run ERC
- Revise!

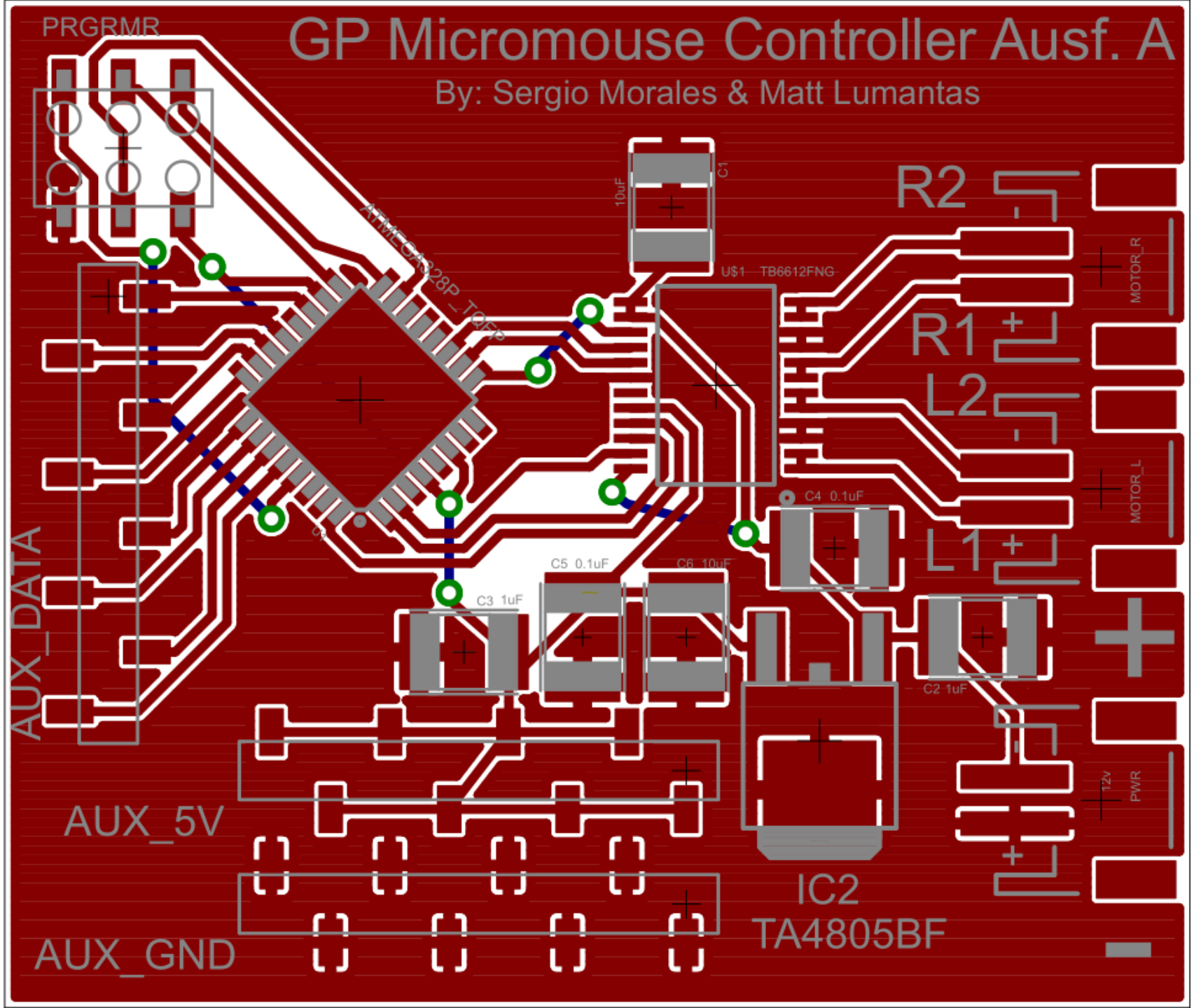



ERC of an early version

# Board Design

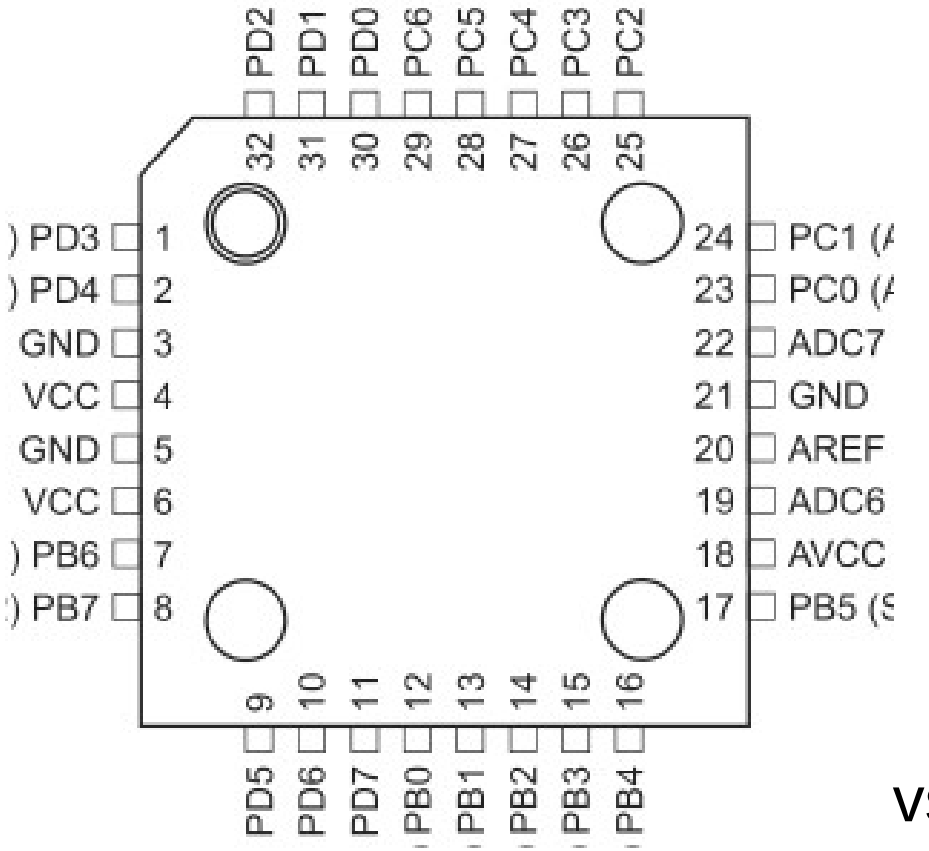
2 Primary Areas:

- Power I/O
- Microcontroller & Data ports

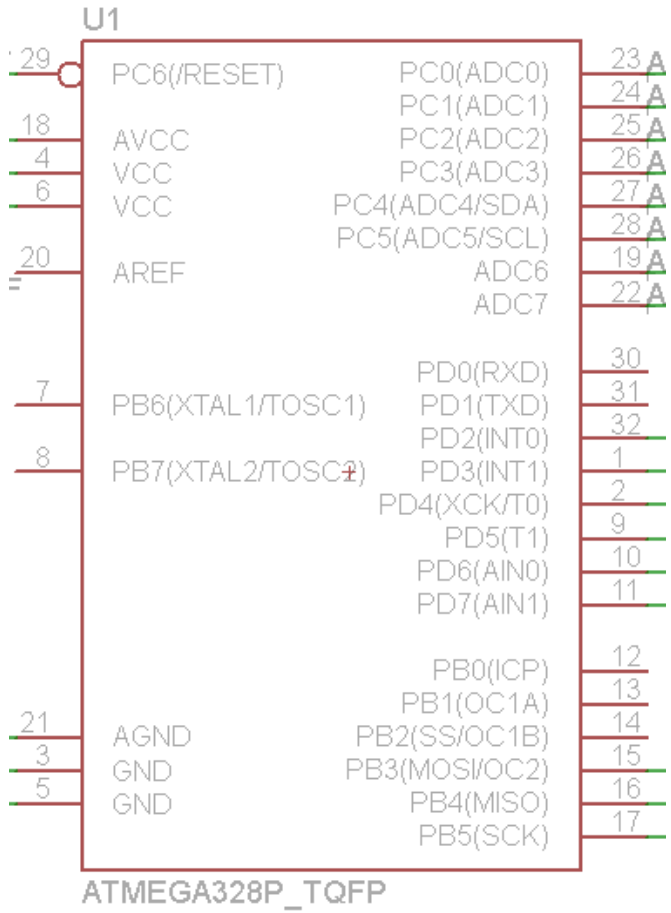


# Board Design Difficulties

- Confusing arrangement of pins in schematic vs. board for ICs
- General routing and positioning problems




Physical pins
vs. Schematic pins



# Bill of Materials

- ATmega328p Microcontroller
- TB6612FNG Motor Controller
- TA4805BF Linear Voltage Regulator (5v)
- Various headers for power I/O and data I/O
- Various capacitors for noise filtering
- Total Price: $ 24.64

Sockets > Mill-Max Manufacturing Corp

All prices are in US dollars.

| Price Break | Unit Price | Extended Price |
|---|---|---|
| 1 | 2.80000 | 2.80 |

Why the heck are 8-pin connectors so expensive?