# Electrical Onboarding: Handout 2

Part 1: KiCAD

Hope you are excited to start designing the drone! The first component we'll be starting with is the motor driver.

Here is an example schematic from last years onboarding project (a servo tester):

- Notice how each major component (microcontroller, connectors, voltage regulator, voltage divider, etc) is organized in its own section.

- Unlike circuit diagrams, schematics use labels instead of long wires, which keeps things neat and readable.
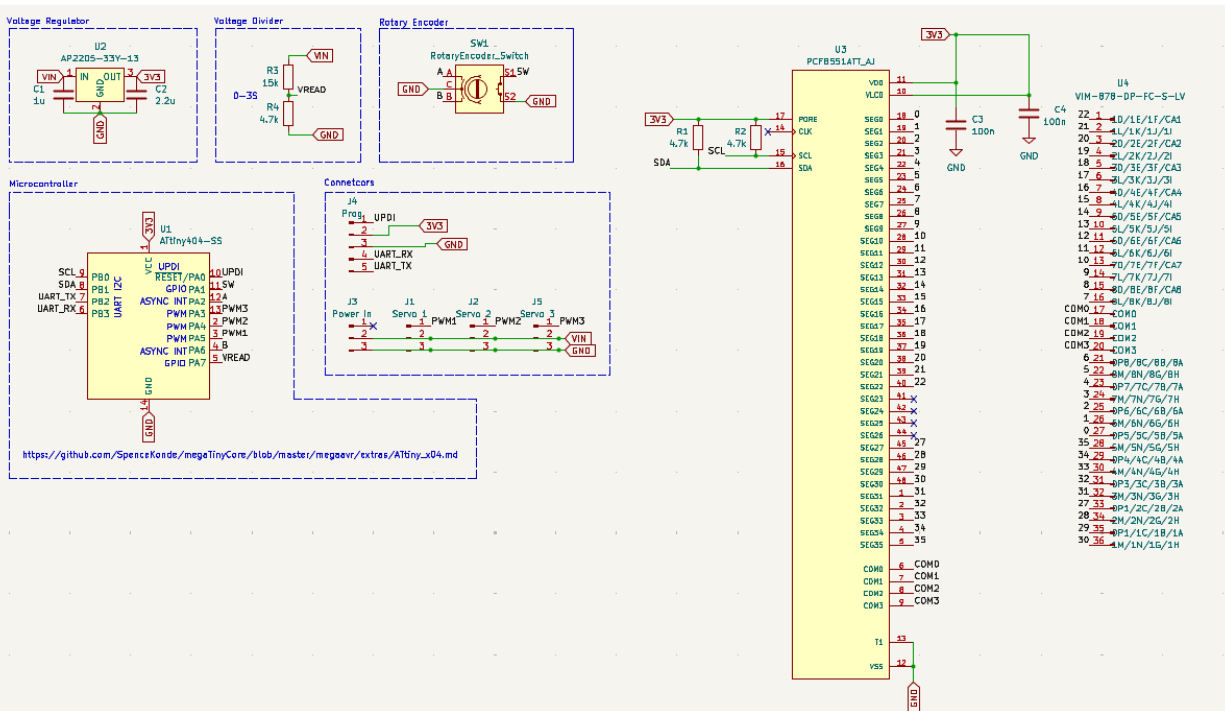
Resources to getting started in KiCAD: Use these as a reference in case you ever get stuck or don't understand anything.

- Getting Started in KiCAD guide

Motor Driver for the Project: DRV8210PDSGR.

You can find the datasheet and necessary schematic files on Digikey:

DRV8210PDSGR

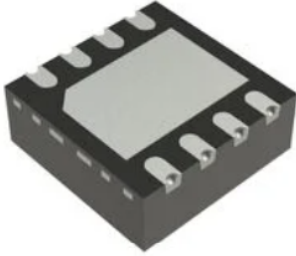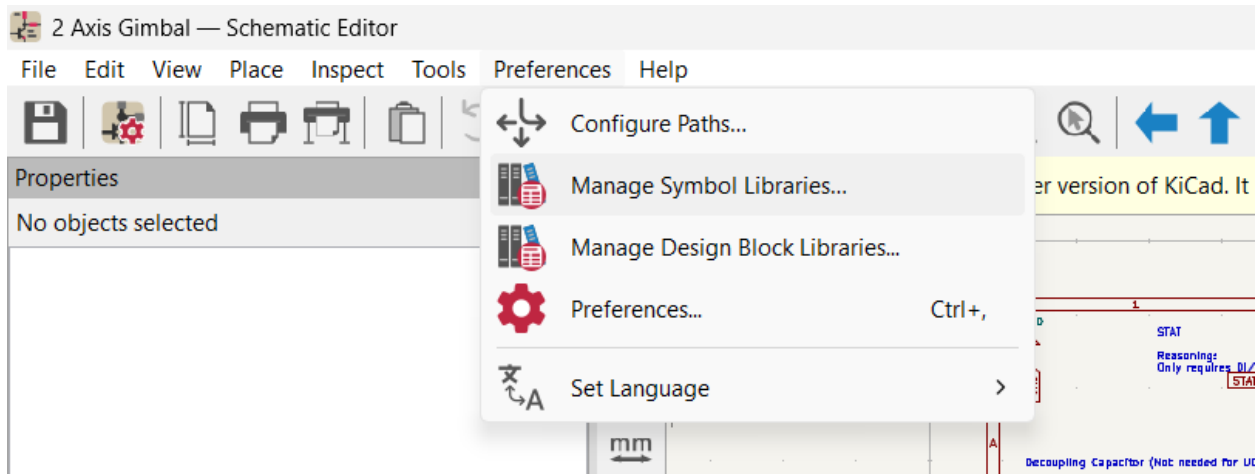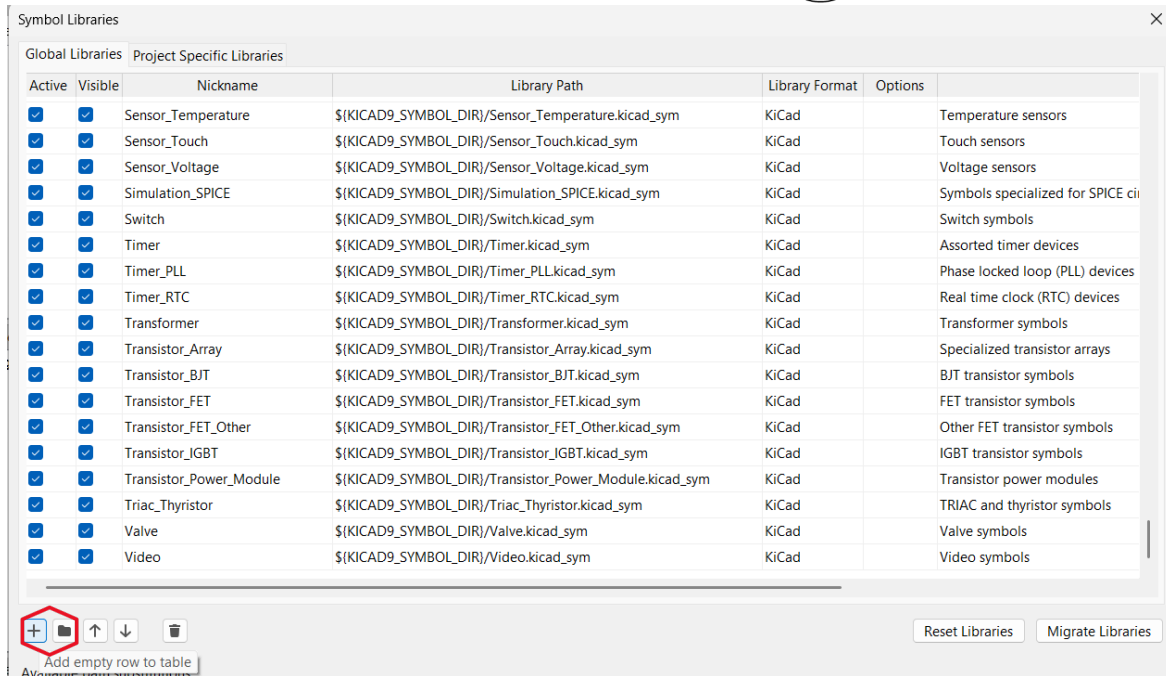|	
DigiKey Part Number	296-DRV8210PDSGRTR-ND - Tape & Reel (TR) 296-DRV8210PDSGRCT-ND - Cut Tape (CT) 296-DRV8210PDSGRDKR-ND - Digi-Reel®
Manufacturer	**Texas Instruments**
Manufacturer Product Number	DRV8210PDSGR
Description	11V, 1A H-BRIDGE MOTOR DRIVER, P
Manufacturer Standard Lead Time	6 Weeks
Customer Reference	
Detailed Description	Bipolar Motor Driver NMOS PWM 8-WSON (2x2)
Datasheet	PDF **Datasheet**
EDA/CAD Models	**DRV8210PDSGR Models**

Image shown is a representation only. Exact specifications should be obtained from the product data sheet.

You can import the schematic like so:

Task:

- Create the motor driver section of the schematic.

- You'll mostly use the following labels:

  - GND

  - VBAT (battery voltage)

  - VCC (regulated smaller voltage)

  - IN1, IN2 (inputs to motor driver)

  - M+, M- (outputs to brushed DC motor)

- Add the required supporting capacitors and resistors (see datasheet).
- Commit your work to your own Git branch before the **Tuesday meeting**.

If you are feeling ambitious, you can try doing some stuff with these components.

Inertial Measurement Unit (IMU): BMI 323

Low Dropout (LDO) Regulator: AP7366EA-33W5-7

Part 2: Git

We will be using Git for version control.

Getting Started:

- The first two videos in [this playlist](#) do a pretty cool job of explaining how we will be using Git.
    - o Feel free to skip around as needed. You know yourself best, so don't feel like you have to waste time on the videos if you think you know what you are doing. At the same time, be honest with yourself and make sure you at least somewhat understand what's going on.
- Please use Git Bash of the command line (not the GUI). I find it to be a useful, cool skill that's not too complicated

Tasks

- Send me your GitHub username ASAP so I can add you as a contributor.
- Before Tuesday, create a branch named after yourself.
- Commit your schematic progress to your branch.
    - Don't worry if it's incomplete or incorrect; just commit something.
    - Do not commit to main.

Part 3: Electrical Background

Exercises: 1.1, 1.2, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.12 from the *Art of Electronics* (should be pinned in the discord). I recommend downloading your own copy. Try to have this by Friday next week, so we can go over some of them.

Deliverables:

- Tuesday 9/19: KiCAD schematic containing your best attempt for the motor driver piece of the schematic committed to the github repository. (Parts 1 & 2)

- Friday 9/26: Electrical Background Exercises

Notes:

- Reach out anytime on Discord (electrical channel). Or dm I guess if you're nervous
- I'm happy to meet on weekends if you get stuck.
- Don't spend more than ~1 hour between meetings (unless you want to)
- If you're stuck for more than 5 minutes, just ask
- This should be low stress. Please don't feel pressured!