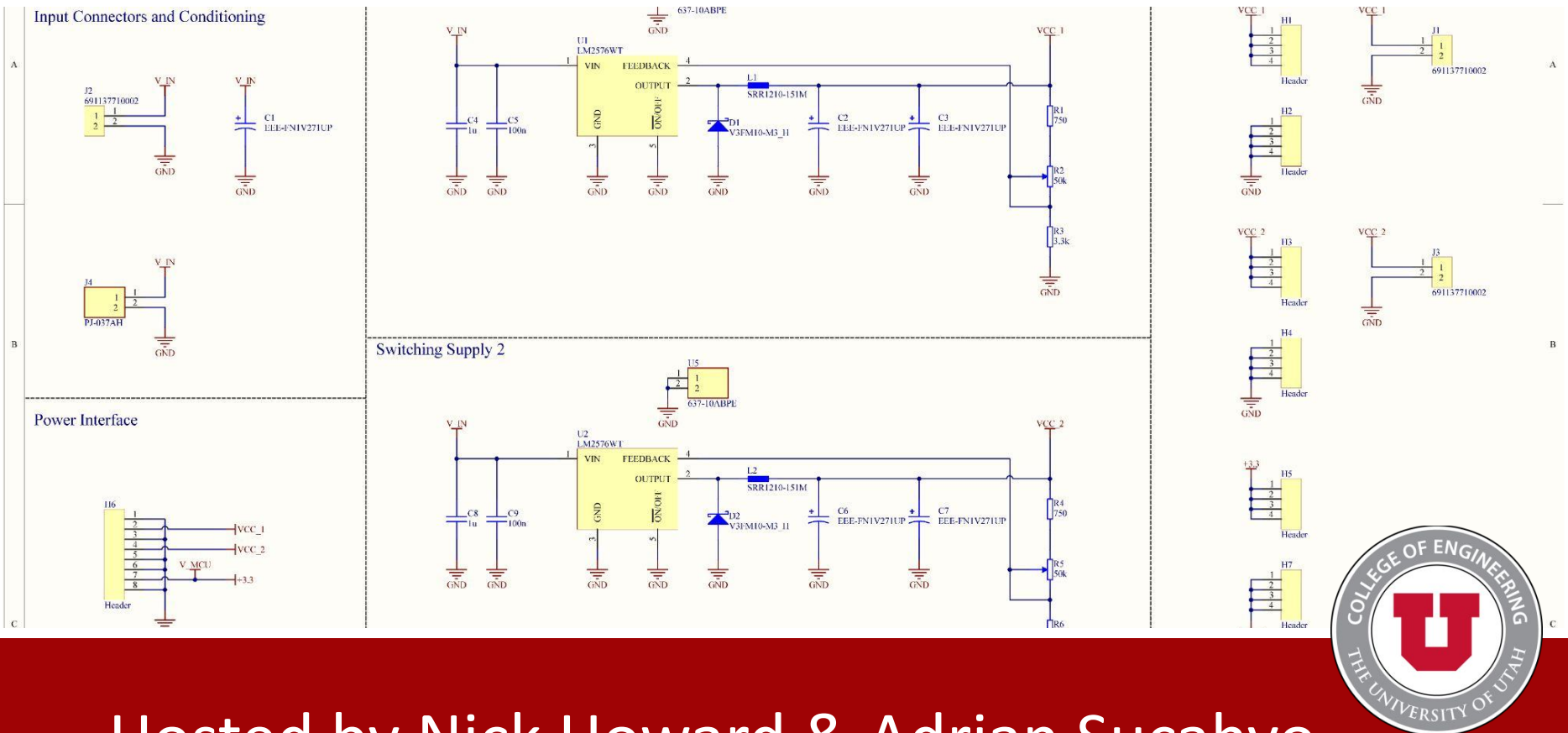# IEEE x FSAE Altium Workshop Week 1: Introduction to Schematics (Power Supply)



## Hosted by Nick Howard & Adrian Sucahyo

# Workshop Outline

- ~9 weeks

  Feb 4 - Introduction to schematics (Power Supply)

  Feb 11 - Introduction to PCB design (Power Supply)

  Feb 18 - Intermediate schematic & PCB design (ESP32)

  Feb 25 - Manufacturing and more

  Mar 4 - Board design help session

      **Spring Break**

  Mar 18 - Introduction to soldering (Power Supply Surface Mount)

  Mar 25 - Introduction to soldering (Power Supply Through-Hole)

  Apr 8 - Advanced board assembly (ESP32 Pick and Place)

  Apr 15 - Final notes/social w/ food!

# Some Logistics

- We **highly** encourage you to attend all sessions
  - Each session is designed to build off of previously discussed material

- By the end of the workshop you will:
  - Make a *cool* adjustable breadboard power supply board and programmable ESP32-based 8 x 12 LED matrix board
  - Understand the basics of schematic layout, PCB design, and board manufacturing
  - Gain some experience with through-hole and surface mount soldering
  - Have a basic idea of advanced board assembly techniques, particularly with the pick-and-place machine in the MEB

# Want More Experience?

- Consider joining the FSAE Team!
  - The Tractive Team is currently looking for students to assist with designing and assembling the electrical systems for an electric formula-style race car
  - No experience required!



U of U FSAE Discord Link

- If you haven't already, please join the IEEE Discord server for additional information and updates regarding this workshop
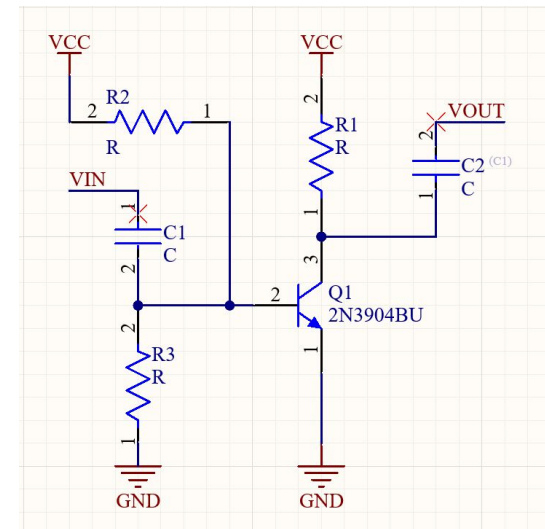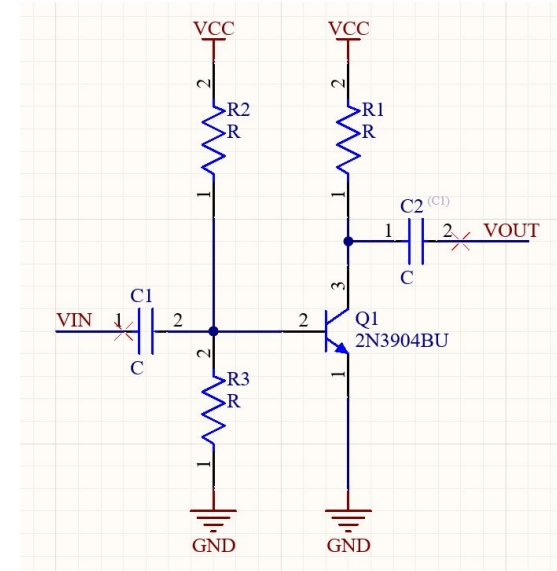


U of U IEEE Discord Link

- A schematic is a graphical representation of an electrical circuit
  - A step up from a block diagram
  - Shows the parts and connections of a circuit
  - Dimensions and component positions are not necessarily represented in a schematic
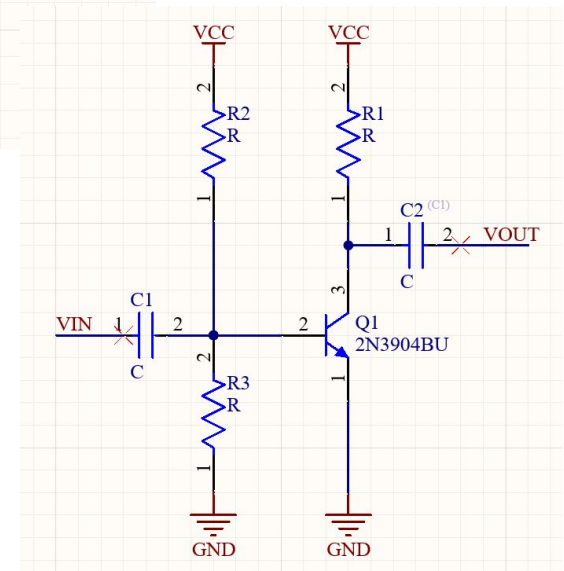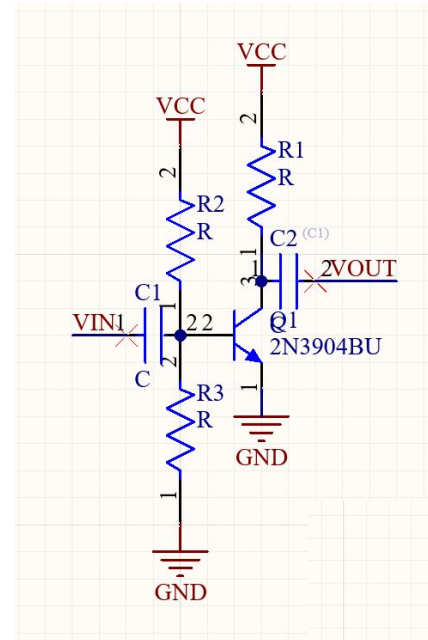
    Consider circuits to the right
  - Used for routing PCB traces

- Keep it readable!
  - Don't overcrowd
    - Enlarge sheet if needed
  - Separate sections into blocks
  - Use net labels
  - Label as much as possible*
    - Label things that aren't immediately obvious
  - Place power nets near the top, ground nets near the bottom
  - Avoid overlapping text
  - Align parts/nets

- You each will have the opportunity to design and assembly your own breadboard power supply with the following features
  - Two 3A buck converters with adjustable outputs
  - 250mA fixed 3.3V linear regulator
  - 20V maximum input
  - Can be powered through a terminal block, barrel jack, or USB-C
  - Interfaces directly with the ESP32 LED matrix board that will be discussed in week 3
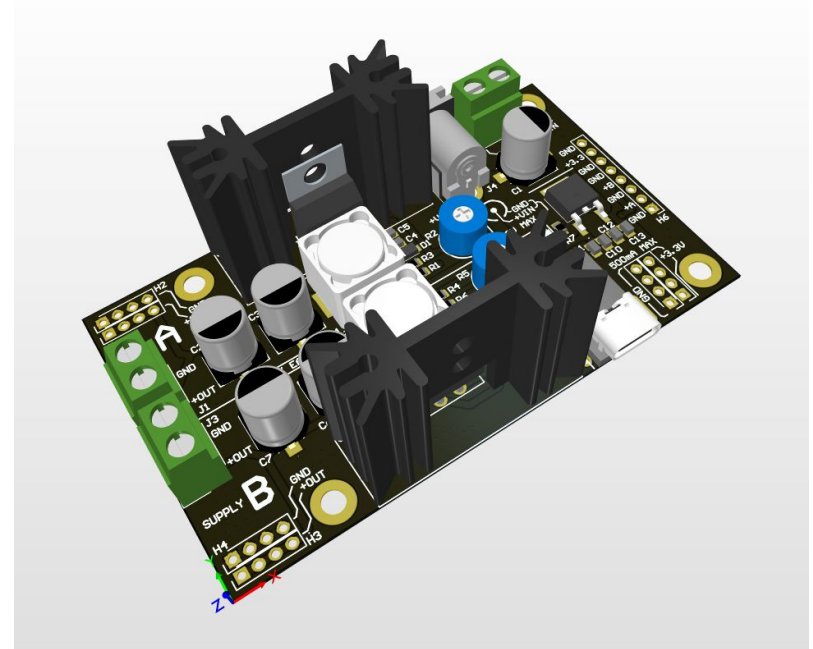
# Questions?

# Download Today's Project Files

- Navigate to the workshop GitHub and download today's files listed under **week01**

# https://github.com/AdrianSucahyo/IEEE-PCB-Workshop-Resources-2025