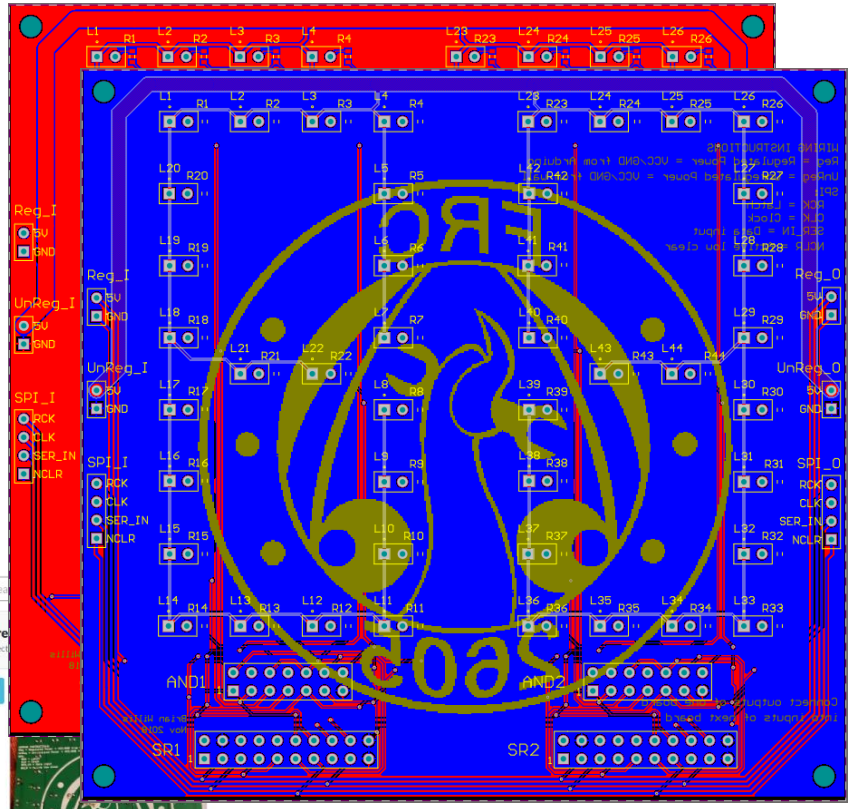
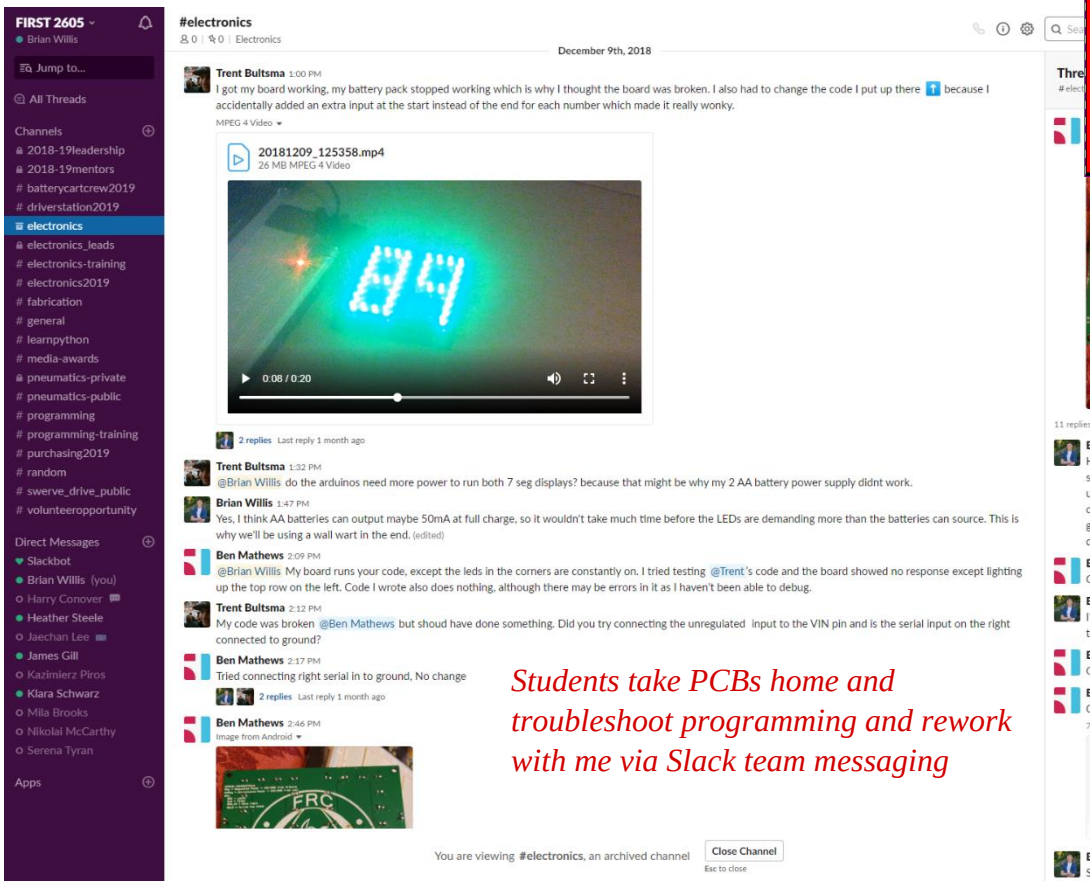
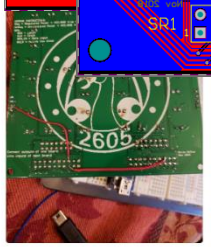
Educational Countdown Timer

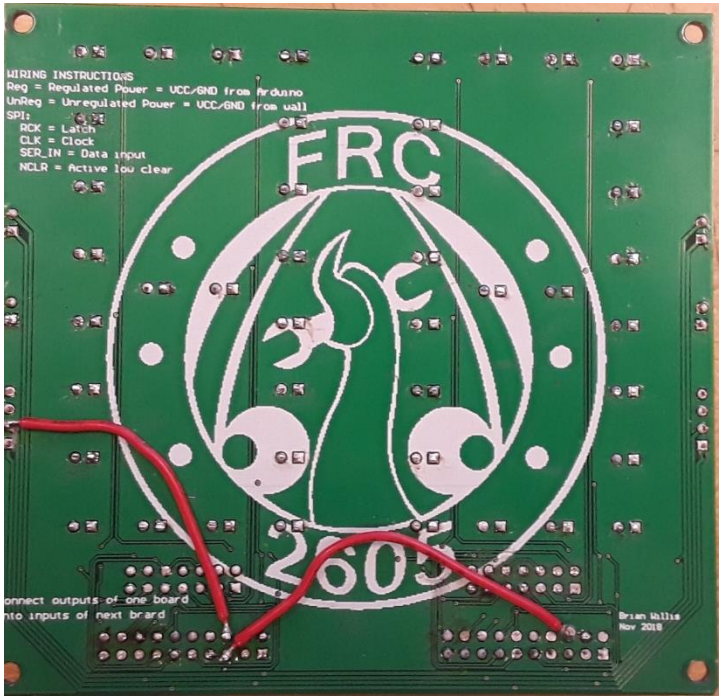
- As a high school STEM mentor, designed 7-Seg countdown timer with *FIRST Robotics* students as an electronics project
- Arduino counts down the seconds until a programmed time (e.g., competition day) via battery-backed RTC
- Gives students sense of scale when creating competition robot
- Used to teach circuit design, prototyping, & troubleshooting, power requirements, PCB fabrication & rework, soldering, Arduino programming, clock accuracy, and serial communication in an engaging and non-intimidating way





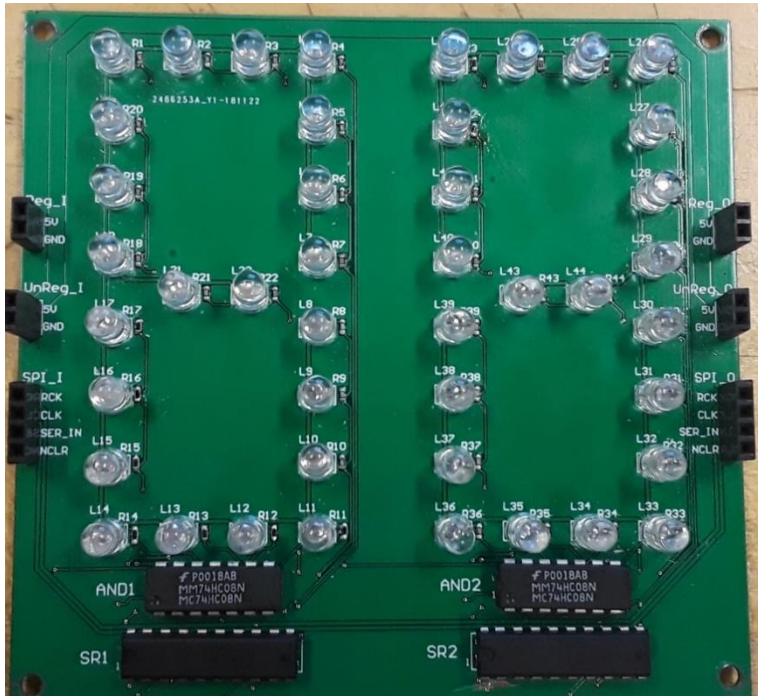
Students take PCBs home and troubleshoot programming and rework with me via Slack team messaging





7-Seg Module (Green)

- Design incrementally taught to students over the course of ~6 weeks by breaking up into sections (power reqs., digital logic, programming, etc.)
- Soldering, troubleshooting, rework, and programming completed with direct student contribution
- Error in trace placement led to PCB rework training



Controller Module (Purple)

- PCB incorporating Arduino, RTC, and I/O headers used as an introduction to PCB fabrication via KiCAD
- Instructed schematic & PCB design with best practices
- Constructed entirely by students from project creation to purchasing with regular feedback