EMPHYSYS

CO-OP Presentation

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About me

- Northeastern University, Class of 2022
  - Electrical and Computer Engineering
- On Campus Involvement
  - Residential Assistance
- First CO-OP at DePuy Synthes Mitek Sports Medicine
  - Embedded Engineering CO-OP

DePuy Synthes
MITEK SPORTS MEDICINE
Johnson & Johnson
FAMILY OF CONSUMER COMPANIES

Power Supply Control

- **Objective:**
  - Design a PCB capable of controlling and monitoring a power supply.
  - PCB responsibilities include:
    - Enabling power supply
    - Relaying any errors to external PCB
    - Providing a pathway to power other PCBs and Windows Tablet PC
- **Major Tasks:**
  - Create and simulate a design using NL5
  - Draw circuit schematic and PCB layout
  - Build, test, and rework board

Power Supply Control

1st Major Task:

- Create and simulate a design using NL5

Takeaway:

- First Electrical Design
- Familiar with NL5
- Learned Fundamentals and Applications of Electrical Components:
  - Filtering, debouncing, ESD protection using resistors and capacitors
  - Timing using comparators
  - Clamping using diodes
  - Switches using MOSFETS

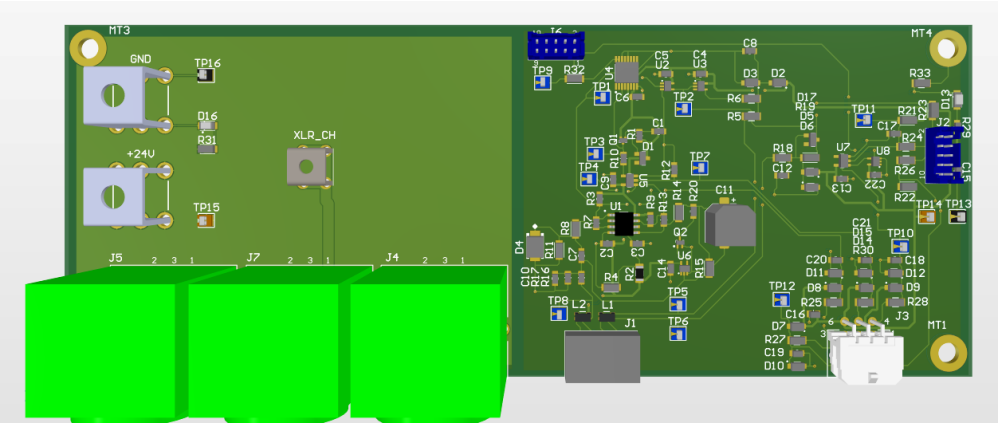
Power Supply Control

2nd Major Task:

- Draw circuit schematic and PCB layout

Takeaways:

- Familiar with Altium
- Learned standard conventions of schematic drawing and PCB layout
- Familiar with searching for components and reading datasheets



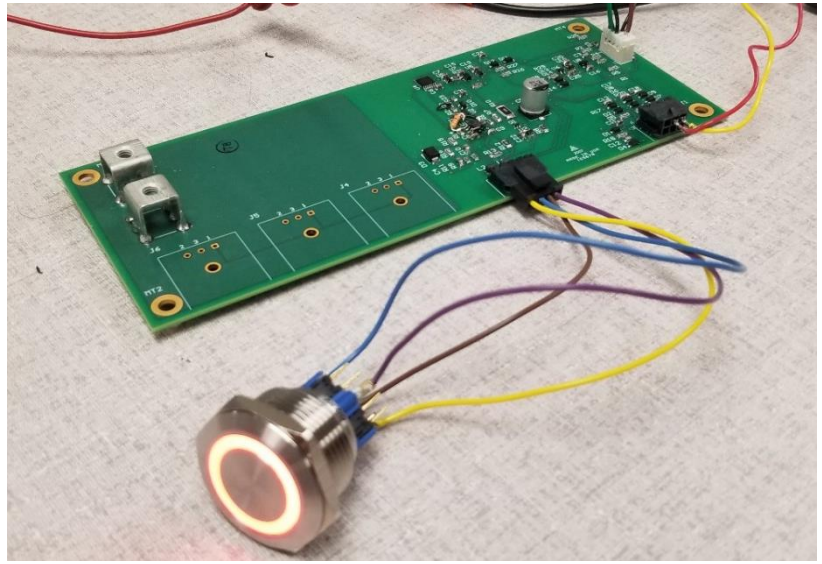
Power Supply Control

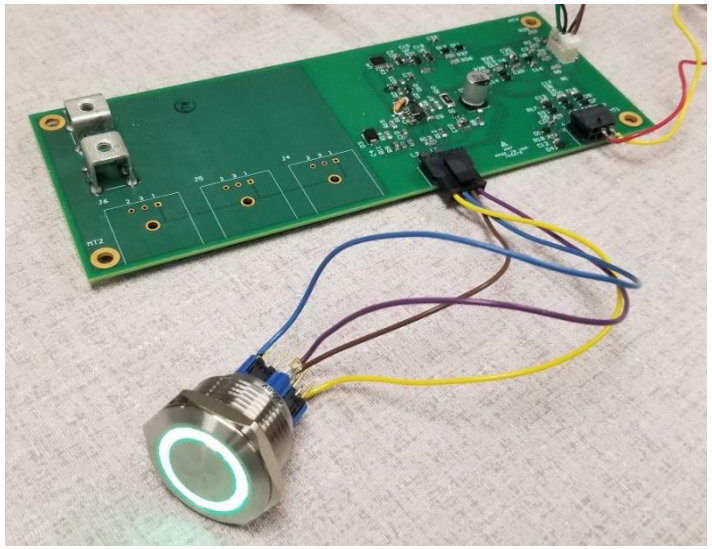
3rd Major Task:

- Build, test, and rework board

Takeaway:

- Experience with tools to effectively debug PCBs (Multimeter, Thermal Camera)
- Tons of soldering opportunities
- Exposure to common mistakes found when building PCBs
- Learned how to correctly rework PCBs and document changes





Testing Documentation

- **Objective:**
  - Capture the tests used to asses the functionality of the first integration of a multi-PCB customer system.
- **Major Tasks:**
  - Design test method and test fixture for Power Supply Unit FRU
  - Extract functionality tests from teammates to assemble and document system-based tests

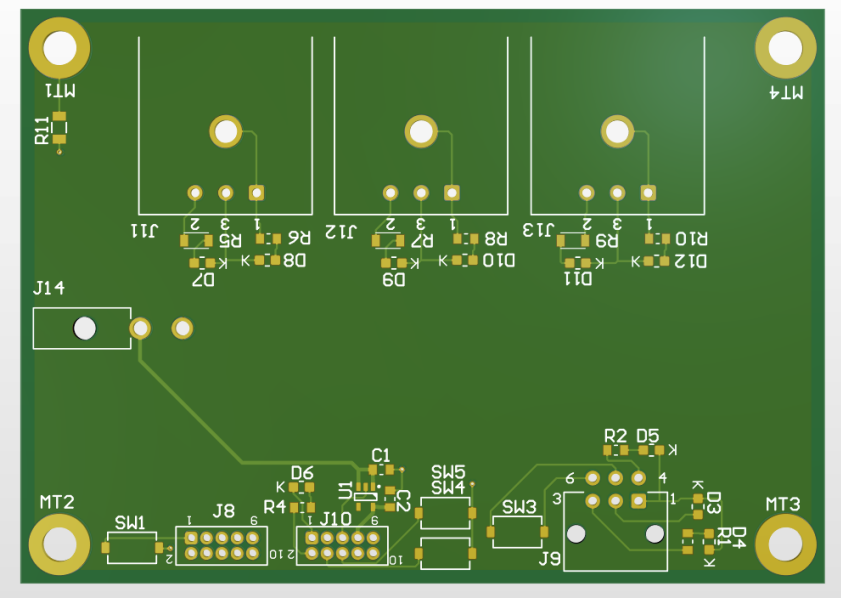
Testing Documentation

1st Major Task:

- Design test method and test fixture for Power Supply Unit FRU

Takeaway:

- Familiar with good methods to design test fixtures
- Learned how to calculating the junction temperature of an LVDO.



Testing Documentation

- **2nd Major Tasks:**
  - Extract functionality tests from teammates to assemble and document system-based tests
- **Takeaway:**
  - Introduced and familiarized with aspects of good software, hardware, and system-level tests
  - Learned best method to document tests, such as structure, depth, and formatting
  - Strengthened ability to communicate and extract information within a team

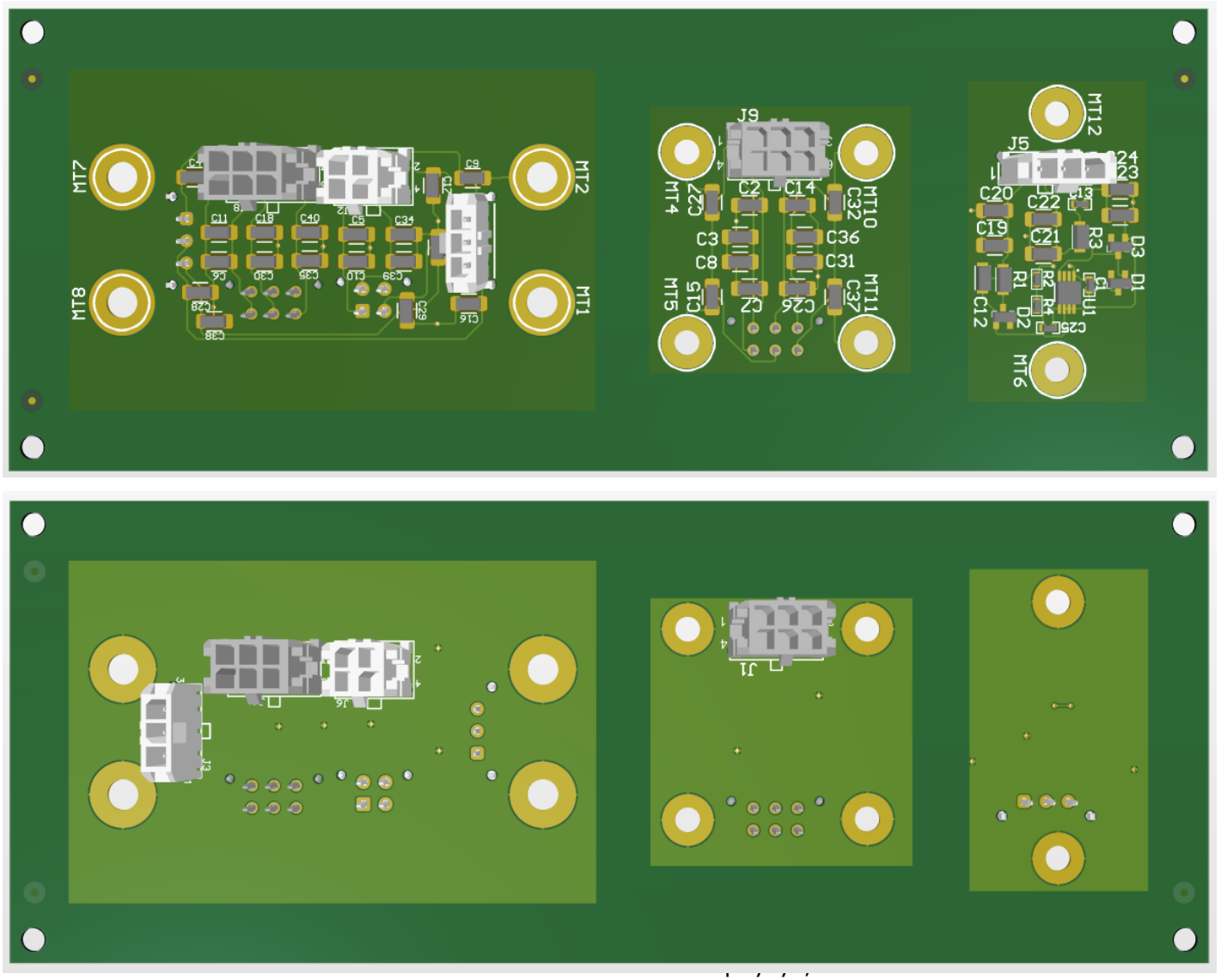
Pass-through Board

Major Task:

- Design the PCB layout for the 3 auxiliary boards

Takeaway:

- Continual exposure and practice of PCB layout conventions
- Learned how to design board for Automated Handling (Tooling Hole, Fiducial Design)



Other Tasks Categories

- **Building and Wiring**
  - More experience in soldering, crimping, and wiring using the right tools/methods
- **Measuring and Testing**
  - Exposure to Network Analyzers and LCR
  - Learned effective ways to organize test results
  - Introduction to concepts like Impedance Matching, Smith Chart, Electric Breakdown
- **Component Searching**
  - Familiar with navigating distributors search engine to locate desired parts
  - Learned key aspects of components that are commonly defined and are of interest
  - Gained experience deciphering component datasheets and picking out desired qualities

Thank You