

# Andy Makovec

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## SUMMARY

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Hardware engineer with experience in designing development boards, writing scripts for test automation, and creating test cases for board bring-up, design verification, and EMC.

## EDUCATION

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**The Ohio State University, Columbus, OH** (May 2019)

B.S., Electrical and Computer Engineering, Electrical Engineering Program of Study - GPA: 3.70/4.0

## ENGINEERING EXPERIENCE

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**Rockwell Automation, Mayfield Heights, OH**

**Hardware Engineer** (May 2019 - Present)

- Designed several development boards to enable test automation in early prototype and final test stages for a series of new I/O products:
  - Designed for requirements such as multiple isolation zones, 12+ high-speed signals, and several power integrity requirements, resulting in designs of 200+ components per board.
  - Oversaw layout performed by a separate layout designer. Facilitated resolution of placement conflicts.
  - Designed a quick-turn PCB to test a high-risk subcircuit. Created and executed test cases to verify the subcircuit.
  - Led DMI review and PCB DFM processes, and assisted in material ordering and organizing production runs.
  - Created test cases for board bring-up and design verification test, and oversaw execution of tests.
- Designed and implemented Python scripts for test automation and results analysis:
  - Designed a Python script to capture test results from multiple pieces of test equipment and generate a test report containing 3000+ data points. Included a GUI for use by technicians.
  - Designed a Python script to visualize backplane communication failures with a heatmap.
- EMC test plan generation (IEC 61000), specifically with regards to ensuring hardware was exercised to functional requirements while under exposure to noise:
  - Designed and implemented Ladder Logic (Allen-Bradley) for test automation.
  - Coordinated flashing of firmware and installation of software to 8 early prototype test setups in order to enable preliminary EMC testing.
- Member of a cross-functional SAFe Agile team (hardware, firmware, and software), collaborating with other teams (~150 person project) to develop a series of 10+ products.
- Served as Scrum Master (50/50 time split with technical work above, Sept 2019 - Sept 2020):
  - Led sprint planning and daily stand-ups, assisted in backlog grooming, and prepared stories and metrics in Jira.
  - Delivered bi-weekly readout presentations to an audience of ~150 people, covering a mix of technical progress and agile metrics.

**Hardware Engineering Co-Op** (January - August 2018)

- Performed EMC Testing of Ethernet-enabled embedded systems products to qualify conformance to the IEC 61000-6-4 standard, including configuring PLCs to automate the testing process.
- Oversaw the hardware-related aspects of a quality control revision of a legacy embedded systems product including DMI review, PCB DFM process, prototype/pilot runs, and last-time buy considerations.
- Investigated viability of potential cost savings in new Ethernet ICs by testing for conformance to IEEE 802.3.
- Designed and analyzed possible PCB layouts to solve space constraint issues in a new product under development.
- Mentored a team of 3 engineering interns on a long-term embedded systems design project.

**The Ohio State University, Analog Electronics Laboratory Monitor**, Columbus, OH (August - December 2017)

- Guided a class of 29 students through a fast-paced analog electronics lab by facilitating questions.
- Taught analog circuit troubleshooting skills through the use of standard test bench equipment.

## TECHNICAL SKILLS

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- **Design Capture:** Mentor Graphics proficiency (Xpedition design capture flow, HyperLynx SI/PI modeling, library management), KiCAD competency (design capture and library management)
- **Programming Languages:** Python proficiency, C/C++ and Java familiarity
- **Version Control:** Git, GitHub, and GitLab competency
- **Other Skills:** Linux, Jira, MATLAB, SAP ECC, Rockwell Software (Studio 5000, RSLinx, FactoryTalk)