1 JOSHUA DAVID BUTLER

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1.1 SUMMARY

Highly Experienced and driven automation and embedded systems engineer with 20+ years in hardware-software integration, specializing in embedded firmware, PCB design, and electro-mechanical systems debugging. Passionate advocate and instructor of AI-driven engineering methodologies, consistently improving software production throughput by 10-20x, more in automation and edge computing environments. Lifelong learner with deep cross-disciplinary engineering expertise, further accelerated by recent advancements in large language models and continuous AI workflow integrations.

1.2 PROFESSIONAL EXPERIENCE

1.2.1 STERIS, Richmond, CA

Embedded Systems Specialist – Operating Room Integration | 3/2022 – Present

- Resolved critical video and fiber optic system issues in medical equipment deployed in operating rooms nationwide.
- Engineered firmware and hardware solutions for PIC microcontrollers and embedded Linux systems, enhancing reliability and performance.
- Developed custom testing frameworks for validating hardware-software integration and legacy product improvements.
- Strategically managed component obsolescence, qualifying alternative parts amidst global supply chain disruptions.
- Diagnosed and optimized firmware to enhance system reliability, significantly improving healthcare outcomes.
- Introduced advanced AI-driven code generation methodologies, increasing development throughput by 10-20x for many tasks.

1.2.2 VACTRONIX SCIENTIFIC, Fremont, CA

Technical Development Manager / Electrical and Software Development Engineer | 5/2021 – 9/2022

- Directed the development and integration of sophisticated physical vapor deposition equipment from prototype to production.
- Automated precision gantry systems for improved manufacturing process control and less manual effort.
- Enhanced HMI and PLC interfaces, delivering improved user experience and extended operational capabilities with ultra-low latency and real-time operation.
- Redesigned hardware, firmware, and software toolchains to address supply-chain constraints, reduce maintenance demands and costs, and extend equipment lifetime.
- Developed advanced embedded system platforms supporting remote diagnostics and control.

1.2.3 INTEVAC, Santa Clara, CA

Hardware and Firmware Development Engineer – Military Night Vision | 7/2020 – 6/2021

- Executed comprehensive PCB bring-up procedures with Altium Designer, validating and tuning high-voltage power supplies by adding automated parameter sweeps and self-calibrating feedback loops.
- Developed robust firmware in C++, Python, and MATLAB for STM32 and ESP32 controller to address precise military design requirements and complex manufacturing workflows.
- Optimized sophisticated low-light camera component design and manufacturing technologies supporting DoD applications.
- Ensured compliance with stringent AS9100, ISO9001, and NIST documentation and security standards.

1.2.4 FESTO, Livermore, CA

Research Engineer / Applications Engineer – Medical Devices | 6/2015 – 2/2020

- Engineered embedded, PLC-based closed-loop control systems for automated medical diagnostic platforms.
- Deployed and validated machine learning algorithms for industrial automation, including image processing and OCR technologies.
- Integrated piezoelectric pneumatic, electrical, and hydraulic components into complex electro-mechanical systems for precise process control.
- Developed embedded logic and signal processing algorithms using C++, Python, and MATLAB.
- Prototyped advanced market-ready medical devices and developed production-support quality testing systems.

1.3 EDUCATION

- **PhD (ABD)—Electrical Engineering |** University of Cincinnati
  - Concentration: Advanced Algorithms and Systems Integration for Point-of-Care Medical Devices
- **Extensive Graduate-level Study |** University of Louisville
  - Biomedical Engineering, Embedded Systems, and Advanced Programming
- **Bachelor of Science—Electrical Engineering; Physics Minor |** Rose-Hulman Institute of Technology

1.4 TECHNICAL SKILLS

Embedded Systems & Firmware:

- Expertise with PIC, STM32, ESP32, Arduino microcontrollers, some experience in FPGAs
- Proficient in RTOS, state machines, real-time systems, distributed real-time automation
- Skilled in I2C, SPI, UART, CAN bus communication protocols

Hardware Integration:

- PCB design and troubleshooting using Altium and OrCAD, among other software and testing packages
- Comprehensive component selection, validation, system and process optimization, and EOL-related redesigns
- Electro-mechanical systems integration and debugging with extensive SolidWorks modeling for FEA

Programming & AI/ML:

- Extensive experience in C/C++, Python, MATLAB
- Expert in machine learning frameworks: TensorFlow, PyTorch, scikit-learn
- Edge deployment of optimized AI/ML models for real-time control and automation
- Experience as AI systems architect, training teams to leverage AI-driven code generation for 10-20x productivity gains

Standards Compliance:

- ISO 9001/13485 Quality Management Systems
- AS9100 Aerospace Standards
- NIST SP 800-53/800-171 Security Frameworks
- IEC Safety Standards (60601, 61010, 61131-3)

Design & Simulation Tools:

- SolidWorks, AutoCAD, COMSOL Multiphysics
- MATLAB/Python-based finite element modeling, derivative analysis, least-squares optimization, and advanced mathematical processing and analysis methods

1.5 PATENTS

- Awarded multiple patents in microorganismal growth control and biological processing technologies
- Developed modified-air dehydration methods enhancing nutritional quality in personalized nutrition applications