Eric C. Beppler, PE

Firmware, Embedded Systems, Electronics Expert
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Expert in embedded systems, device firmware, and software-controlled hardware. Over 12 years of professional experience designing, analyzing, and debugging safety-critical and commercial embedded systems across medical, industrial, IoT, and life-science platforms. Extensive experience performing root-cause analysis, code-level failure investigations, and system architecture reconstruction. Prior experience as Technical Reviewer, Expert Consultant, and Failure Analysis Lead for Commercial, Regulatory, and Quality Engineering. Licensed Professional Engineer in Computer Engineering.

EDUCATION

Master of Science — **Computer Engineering**
North Carolina State University

Bachelor of Science — **Computer Engineering**
North Carolina State University

Bachelor of Science — **Electrical Engineering**
North Carolina State University

CERTIFICATIONS

Professional Engineer (PE), State of Colorado
Computer Engineering, License #: PE.0059692

IPC Certified Interconnect Designer (CID)

PROFESSIONAL EXPERIENCE

Ringtail Labs, LLC
Partner — Nov 2022 – Present

- Served as lead technical authority on embedded firmware, electrical systems, and firmware-controlled devices for commercial, regulatory, and failure-analysis engagements.
- Principal Engineer for electrical design and firmware development, leading the architecture and execution of custom electronics platforms, embedded firmware, and associated software systems across multiple regulated and non-regulated client products.
- Conducted firmware analysis, including source-code review, functional equivalence analysis, architectural comparison, and defect causation investigations.
- Performed root-cause analysis across firmware, hardware, and system interfaces to determine failure mechanisms, compliance deviations, and defect origin.
- Authored formal engineering failure analysis reports used for executive decision-making, regulatory response, and legal matters.
- Evaluated safety-critical firmware behavior under fault, power-loss, timing, and watchdog failure conditions.

- ➢ Drove applied R&D programs in instrumentation, diagnostics, automation, and novel sensing platforms, translating exploratory prototypes into manufacturable and scalable electrical and firmware architectures.

LightDeck Diagnostics
Senior Software Manager Apr 2022 - Nov 2022

- ➢ Directed embedded firmware and application software development for regulated consumer and medical devices under ISO 13485 and IEC 14971.
- ➢ Directed development of Qt-based application software and embedded firmware in C/C++, supporting device control, user interfaces, data acquisition, and system integration.
- ➢ Oversaw automated test infrastructure supporting objective firmware validation and regression analysis. Planned and oversaw the migration of CI/CD infrastructure from Jenkins to GitLab CI, improving build reliability, automated testing coverage, and deployment workflows for both application and firmware codebases.
- ➢ Led investigation and resolution of firmware defects affecting usability, data integrity, and device reliability.

Bio-Rad Laboratories
R&D Manager Oct 2021 - Apr 2022

- ➢ Integrated incoming Dropworks teams, processes, and tools with existing Bio-Rad teams to expand engineering capabilities and facilitate an aggressive product lifecycle objective.

Dropworks, Inc. (Acquired by Bio-Rad Laboratories)
Director of Electrical and Software Engineering Jan 2020 - Oct 2021

- ➢ Developed a team, product, and business model leading to the acquisition of Dropworks, Inc and the Continuum ddPCR instrument by Bio-Rad Laboratories for $125M in October 2021.
- ➢ Established, led, and managed the Electrical and Software Engineering teams to deliver the Continuum dfPCR system and Insight Software for the Quantification of Nucleic Acids.
- ➢ Recruited software developers, electrical engineers, technicians, and drove employee training, development, promotion, and performance management.
- ➢ Designed and implemented product development roadmaps to ensure on-time delivery of requisite functionalities and features for several product iterations through establishment of requirements, specifications, and success criteria via utilization of Agile and Scrum project management systems.
- ➢ Managed and performed ongoing maintenance and feature expansion of embedded and application software, driving continuous bug reduction and successful migration of core system architecture to higher-performance computing platforms.
- ➢ Led a multi-disciplinary team of mechanical designers, research scientists, and electrical, optical, and software engineers to ensure Continuum is compliant with safety, EMI, and FCC

requirements as well as international standards as applicable to a Research Use Only life sciences product.
- ➢ Developed internal test and development tools, service utilities, and customer-facing software to facilitate all operational aspects of Continuum.

Senior Firmware Engineer, Senior Manager Jun 2019 - Jan 2020

- ➢ Architected an electronic system composed of analog and digital electronics for the control of electro-mechanical, optical, and thermal systems. Designed and coordinated the manufacturing of mixed-signal PCBAs.
- ➢ Led firmware architecture definition for proprietary real-time control systems supporting nucleic acid quantification. Developed software includes code to run on custom PCBAs and commercially available single board computers, including RTOS, data processing utilities, and bare-metal firmware.
- ➢ Coordinated hardware and software projects and deliverables with external contractors to supplement internal teams. Identified, onboarded, and managed contractor relations across the US and abroad.
- ➢ Delivered internal test and development tools, service utilities, and customer-facing software to facilitate all operational aspects of Continuum.

Arrow Electronics

IOT Applications Engineer Jun 2018 - Jun 2019

- ➢ Managed and resolved customer issues across IoT and embedded engineering topics, including: 32 and 8-bit MCUs, sensors, board layout and routing, RTOSs, bare metal applications, Bluetooth (LE, 4, 5.1, Mesh), and LTE Cat-M1.
- ➢ Established, deployed, and supported IDE and debugger environments (Simplicity Studio, STM32CubeIDE, GCC toolchains, J-Link/ST-Link) for customers and internal teams, enabling rapid firmware bring-up, deterministic debugging, and scalable development workflows.
- ➢ Designed and maintained Board Support Packages (BSPs) including startup code, clock configuration, low-power profiles, linker scripts, bootloaders, and pin multiplexing to accelerate product development across hardware platforms.
- ➢ Architected and supported RTOS-based firmware systems using Micrium and FreeRTOS.
- ➢ Developed and debugged wireless drivers and protocol integrations spanning Bluetooth Low Energy (BLE), Wi-Fi, Zigbee, LoRa, and LTE, supporting secure provisioning, field updates, and production connectivity validation.
- ➢ Created evaluation and prototyping tools for new technologies and components, including custom eval kits and prototype software tools, with over 5000 units produced and distributed.

VieMetrics, Inc.

Co-Founder & Chief Technology Officer Dec 2016 - Jun 2019

- ➢ Incorporated a biomedical device research and development company dedicated to creating innovative systems to personalize and improve diagnosis and treatment of chronic health issues.
- ➢ Managed contracts to provide research and development services in the wearable health devices space.
- ➢ Created full-scale production-ready wearable devices for long-term, low-power data acquisition and reporting. Worked with suppliers, manufacturers, assemblers, and clients to create novel turnkey solutions.
- ➢ Architected and led firmware development in C/C++ for biomedical, life-science, and consumer wearable devices, including real-time sensing, data acquisition, power management, communications, and fault handling on resource-constrained microcontrollers.
- ➢ Designed embedded drivers and hardware abstraction layers (HALs) for sensors, BLE radios, storage, and power ICs, supporting robust production firmware across multiple device platforms.
- ➢ Built Python-based test utilities, hardware-in-the-loop (HIL) tools, and manufacturing diagnostics for automated firmware validation, sensor characterization, production bring-up, and field debugging.
- ➢ Developed PC-side Python drivers and analysis pipelines for streaming, parsing, and validating biomedical signal data during verification, validation, and clinical data collection.
- ➢ Led firmware verification, low-power optimization, and reliability hardening for long-duration battery-operated medical and consumer devices deployed in real-world environments.

PATENTS

Continuous Methane Monitoring Device

- U.S. Utility Patent Application: US 2024/0060959
- U.S. Design Patent: USD1086914S1 / US D1,086,914 S

PUBLICATIONS

"A System for Assessment of Canine-Human Interaction during Animal-Assisted Therapies," Jul. 2018, doi: https://doi.org/10.1109/embc.2018.8513384.

"Accelerometer based Active Snore Detection for Behavioral Modification," *PubMed*, pp. 2881–2884, Jul. 2018, doi: https://doi.org/10.1109/embc.2018.8512941.

"An Ultra-miniaturized Near Infrared Spectroscopy System to Assess Sleep Apnea in Children with Down Syndrome," *PubMed*, pp. 2877–2880, Jul. 2018, doi: https://doi.org/10.1109/embc.2018.8513038.

"Low-Power Wearable Systems for Continuous Monitoring of Environment and Health for Chronic Respiratory Disease," *IEEE Journal of Biomedical and Health Informatics*, vol. 20, no. 5, pp. 1251–1264, Sep. 2016, doi: https://doi.org/10.1109/jbhi.2016.2573286.

"Solar powered wrist worn acquisition system for continuous photoplethysmogram monitoring," *PubMed*, Aug. 2014, doi: https://doi.org/10.1109/embc.2014.6944289.

"Wearable wireless sensors for chronic respiratory disease monitoring," pp. 1–6, Jun. 2015, doi: https://doi.org/10.1109/bsn.2015.7299411.