

George 'Clarke' Monroe IV

EMBEDDED SYSTEMS ENGINEER

- Interested in developing high-quality electronics and software/firmware for unique embedded systems with tough functional and performance requirements.
- Experience programming, configuring, and maintaining a wide variety of automation and embedded systems including a mobile robotic vending unit, an ultraviolet LED water disinfection system, radar systems on military aircraft, custom embedded test fixtures, and numerous industrial automation control systems.
- Communicates well, both orally and in writing, and thrives in a collaborative team environment.
- A hands-on, energetic, and passionate lifelong learner who values strong working relationships, accurate documentation, and consistent coding and configuration management practices.

EDUCATION

M.S. Electrical and Computer Engineering, Georgia Institute of Technology
Minor in Computer Science. December 2012. GPA: 3.4 / 4.0

B.S. Electrical and Computer Engineering, University of North Carolina at Charlotte
December 2009. GPA: 3.8 / 4.0

EMPLOYMENT EXPERIENCE

The Coca-Cola Company – Atlanta, GA

February 2016 – August 2017

Electronics Engineer (18-month contract)

- Primary Role: The sole engineer responsible for developing embedded hardware and software for several custom consumer engagement mobile robotic vending units. Overall responsibilities include designing, developing, testing, integrating, and documenting all electrical aspects of the project. Served as a vital member of the small group of talented, diverse, and hardworking individuals that made up the development team.
- Technical responsibilities included interpreting, updating, and generating electrical schematics (Altium, AutoCAD Electrical), performing surface-mount and through-hole PCB construction and modifications, and further developing and expanding the software (C/C++) responsible for controlling multiple robotic mobile vending units (Atmel MEGA 2560). Other tasks included configuring communications between XBee Pro (ZigBee) transceivers, integrating essential safety measures, designing control panel schematics, layouts, and supervising assembly and wiring.
- Provided timely and accurate updates to the technical team, management, as well as other stakeholders.
- Organized and scheduled electrical efforts including delegating tasks to technicians
- Provided innovative solutions to resolve tough technical problems as well as enhance the users' experience in creative and unexpected ways.
- Design considerations were made to ensure sufficient performance, reliability, upgradeability, ease of use, aesthetics, and future maintainability.
- Integration of off-the-shelf components/modules in a custom configuration to meet unique functional requirements

Georgia Tech Research Institute – Atlanta, GA

December 2011 – February 2016

Research Engineer I (Full-time)

- Primary Role: Coordinate, oversee, and perform the development and testing of software for embedded systems on military aircraft and associated test equipment for projects sponsored by the US Air Force, Air National Guard (ANG), and US Navy.
- Technical Responsibilities: Develop software for embedded devices (Assembly, C, and C++). Write and execute tests to verify and validate software updates. Perform post-test analysis of data logs to gather important statistics regarding rare problematic events. Diagnose, record, and resolve software issues. Write scripts (Python and Visual Basic) to automate tests, process data, and other various tasks. Create desktop applications (C#) to interact with embedded devices.

- Non-technical Responsibilities: I wrote and presented both technical and non-technical reports and presentations to colleagues, customers, and various levels of management. I interfaced with clients and oversaw work being carried out by subcontractors. Additionally, I supervised students and other engineers.
- Designed, constructed, and programmed (C++) a custom embedded device using a TI Tiva C Series LaunchPad (IC: TM4C123GH6PM w/ ARM Cortex-M4F core) and a touchscreen. The unit operated the attached radio frequency (RF) equipment based on inputs from either the system under test (via RS-485), a computer console (via RS-232), or manually via the touchscreen. Furthermore, I supervised a software engineer and authored all support documentation.
- Developed and documented two significant software updates for the F-16's ALR-69 Radar Warning Receiver (RWR). Written in Assembly, these updates integrated the ALR-69 RWR with a new Fire Control Radar (FCR) and a new jammer pod.
- Repurposed a GTRI embedded design into a versatile lab tool which accurately (50ns precision) and reliably delayed and stretched pulses received on twelve inputs and applied them, in any combination, to twelve outputs. A GUI application, written in C#, was developed to program the embedded device over an Ethernet connection. I supervised a co-op through the development of the windows application and authored a majority of the supporting documentation.
- Made significant technical contributions to the development and initial release of the Hardware Open System Technology (HOST) Standard v1.0. Developed to provide an open-source hardware standard for high-performance mission computers designed for military use.
- Required US DoD security clearance

Factory Automation Systems Inc. – Atlanta, GA

Summer 2010, January – July 2011

Embedded Systems Engineer (Part-time during graduate studies)

- Worked closely with project managers and senior level controls engineers to design and develop custom automation systems
- Programmed Allen-Bradley PLC's (Programmable Logic Controllers), HMI (Human-Machine Interface) touchscreens, VFD's (Variable Frequency Drives), and a 3D imaging system
- Verified and authored industrial electrical schematics
- Wired, tested, and tagged electrical panels
- Projects ranged the following industries: automotive, natural gas, power generation, pharmaceutical, consumer goods, industrial chemicals, glass, carpet, and hardwood lamination
- Worked on projects for Johnson & Johnson, GLAD, Clorox, P&G, Mercedes, Viracon, Toyo Tires, Mohawk, and Ecolab

Dot Metrics Technologies Inc. – Charlotte, NC

May 2008 – December 2009

Embedded Systems Engineer / Research Assistant (Part-time during undergraduate studies)

- Designed and developed the controller for an Ultraviolet LED water disinfection system
- Generated all electrical schematics, performed board layout, part selection, etched and drilled PCB, soldered components, wrote the firmware (written in C) for the microcontroller (an Atmel ATTINY13V-10) and performed tests to characterize LED performance
- Constructed test fixtures and executed biological tests to ensure adequate disinfection of E.coli.
- Used SolidWorks simulations to optimize the disinfection cavity by tracking particle flow

Duke Energy – Oconee Nuclear Power Station – Seneca, SC

Summer 2007

Engineering Intern (Internship during undergraduate studies)

- Documented the level of security of digital systems throughout the plant for the NRC mandated "Cyber Security Adherence Document."
- Evaluated, inspected, verified, and corrected problem tickets ranging from equipment malfunction to technical drawing errors
- Required nuclear facility security clearance

SKILLS

Communications

Strong written and verbal communication skills, professional and respectful, passionate about efficiently providing the best possible product and service, takes pride in his work, is pleasant to work with, and enjoys working with others.

Hardware Development

Designed and built various test fixtures. Experience with the complete design and fabrication of custom circuit boards – schematic design, BOM, PCB layout and routing, etching, drilling, and soldering.

Electrical Components

Motors (DC, AC, servos, steppers), encoders, transformers, relays (mechanical, solid state), ESCs (electronic speed controllers), cameras (b/w and color), video transmitters and receivers, H-bridges, power supplies/regulators (linear, switching, adjustable, LVDO, buck, boost), LED Constant Current drivers, LED's (discrete colors, RGB, and individually addressable), LCD displays (monochrome, color, touchscreen), capacitive touch sensor, level shifters, amplifiers, filters

Communication Protocols

UART, I2C, SPI, 1553, RS-485, RS-232, USB, Zig-Bee, Ethernet (TCP/IP, UDP), Z-Wave, Ant, Bluetooth, Wifi

Instrumentation

Oscilloscopes, Function Generators, Logic Analyzers, Pulse Generators, RF Generators, RF Network Analyzers, Spectrum Analyzers, Data Acquisition Systems, Programmable Logic Controllers, 3D Camera System, Scanning Electron Microscope, Multimeters, AC & DC Power Supplies

Coding Languages

C, C++, Assembly (MIL-STD-1750A), Python, C#, Visual Basic, Matlab, VHDL

Embedded Platforms

Written software for 8-bit, 16-bit, and 32-bit CPU's including microcontrollers and development boards from Atmel, Texas Instruments, Arduino, Raspberry Pi, Microchip PICDEM motor controller, Renesas, Xilinx, and Allen-Bradley Programmable Logic Controllers (PLC's).

Microcontrollers:

TI – TM4C123GH6PM, MSP430G2452, MSP430G2211, LM4F120H5QRF1G

Atmel – ATMEGA328P, ATMEGA2560, ATTINY13V-10

ST – STM32F401, STM32F103

RF Modules:

Zig-Bee – AT91SAM7S64

ANT - ANT11TS33M5IB

Bluetooth – RN52-I/RM

WiFi – ESP8266

All Stages of the Software Lifecycle

Requirements, Design, Development, Testing, Debugging, Delivery, and Maintenance

Software Development Models

Agile, Incremental, and Waterfall

Engineering Software

Code Composer Studio, Microsoft Visual Studio, Eclipse, AVR Studio, Aptana Studio, Eagle PCB Layout, Beyond Compare, Notepad++, O10 Editor, VIM, Adobe Inventor (3D Modeling), Matlab, PSpice, AutoCAD, LabVIEW, RSLogix5000, RSLinx, FactoryTalk Viewer

Collaboration & Configuration Management Software

Atlassian JIRA & Confluence, GIT, MKS, and SharePoint

Operating Systems

Windows (10, 8, 7, XP), Linux (Raspbian, Ubuntu, Fedora), VxWorks, QNX

Productivity Software

Microsoft Office Word, PowerPoint, Excel, Access, Visio, OneNote, Outlook, Project. Familiar with programming Microsoft Office macros to automate complex tasks.

Equipment

- 3D printer, reflow oven, soldering iron
- Machine Shop equipment (milling machines, lathes, press brakes, drill presses, belt grinders, measuring and inspecting equipment)
- Common workshop equipment (hand tools, power tools, saws, sanders, etc...)
- Forklift, Scissor Lift, Skid Steer Loader, Excavator, Bailer, Shredder

Leadership

- Sent to visit customers on roughly 40 different occasions
- Supervised students and other engineers through various tasks and projects
- Represented GTRI at two career fairs
- Teaching assistant for electronics lab – Spring, Fall 2010
- Led the design efforts of various electrical systems at Dot Metrics Technology Inc.
- Principle engineer on the senior design team at UNC Charlotte - awarded 2nd place

Attributes

- Excellent written and oral communication skills
- Strong analytical ability
- Enjoys working with others
- Enjoys brainstorming and solving challenging problems
- Strong sense of personal integrity. Principled.
- Highly flexible in a changing environment
- Outgoing, energetic, and creative
- Compassionate and diplomatic in relating to others

Achievements

- Received multiple GTRI Spot Awards for initiative, teamwork, and exceptional customer support
- Fundamentals of Engineering (FE) exam – Fall 2009
- Amateur Radio Operator - General class license (call sign: KG4OQL)
- Eagle Scout – May 2002

Volunteer Work

- Served as a judge for the preliminary round of the Georgia Tech InVenture Prize – January 2015
- Mentor for both FIRST Robotics teams at Holy Innocents Episcopal High School – Fall 2013
- Mentor for the ELSYS-TAG High School Summer Interns program – Summer 2013
- American Red Cross blood drives
- USO (United Service Organization) at Charlotte Douglas Airport – assisted traveling troops
- Prepared and served meals at the homeless shelter
- Habitat for Humanity – framing and landscaping
- Hurricane Katrina relief mission trip
- Cabarrus County Community Free Clinic

Interests/Hobbies

- Spending time with family
- Making small gadgets/electronics
- Designing and printing 3D parts
- Flying remote controlled aircraft
- Kiteboarding
- Ultimate Frisbee