

# TOM GORDON

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Electrical Engineer with over twenty-five years of experience with real-time, object-oriented embedded firmware and Windows software design. Expert in C/C++ and assembly as well as very comfortable with hardware design, design for manufacturing, hardware/software integration, and testing. Meticulous coder with excellent documenting skills.

## Skill Set

- Bare-metal, low-power, real-time FW design & support
- Windows programming
- C/C++, C#, assembly, Python, Perl, Java, Robot Framework
- Doxygen-style commenting
- GIT, CVS, SVN, TFS version control
- Hex file manipulation
- Communication protocols
- Modular testing, test scripts
- Event logging
- PID control algorithms
- Embedded boot-loaders
- Test fixtures and automated testing
- Prototyping and simulation
- Database design, SQL
- Schematic and Board Layout
- DFM, DFT methods
- Thread and Atmel mesh wireless protocol
- Linux device drivers
- Medical and lab devices
- Time & date algorithms
- Ergonomic design
- Customer relations
- Factory automation
- Encryption
- HTML, XML, JSON, Javascript, Java Servlets, website design
- 3D modeling
- Digital & analog design

## Professional Experience

**Barefoot Software Consulting** – Cary, NC

1993 – present

### Sole Proprietor

Collaborate with hardware, mechanical and board layout design firms on original and rework design projects. Work with customers from design concept to final product launch. Provide services as an independent software consultant on both long and short-term projects. Help companies establish best practices in code development, tracking and testing.

### Key Accomplishments:

- Currently contracted to Porticos, Inc., as a senior product development engineer. Contributions include:
  - Establishing firmware capabilities for Porticos (procedures and best practices, code management and version control, documentation, risk assessment and time estimation).
  - Designing and bringing to production firmware for the XL Extreme Speaker Mic project for L3Harris. This project required testing to stringent NFPA standards, and developing code to allow recovery from temperatures pushing part design limits.
  - Designing and bringing to production firmware for the Accupoint Advanced Next Gen project for Neogen. Architecture was built around an ad-hoc cooperative multi-tasking OS to monitor a range of sensors and a touch screen UI, and routing multiple serial packet protocols through both serial USB and Wi-Fi. Challenges included filtering and displaying thousands of cross-referenced setup and result records with minimal delay, and dynamically adapting to Hall-effect thresholds.

- Modifying underlying Android/Linux LED drivers for ClearCaptions, to replace LED driver chips no longer available.
- Contracted to Cree Intelligent Lighting to help with SmartCast wireless endpoint firmware development.
- Developed BACnet simulator Linux-based appliance for testing protocol compliance of Cree Intelligent Lighting products, using Python and Robot Framework scripting.
- Developed Python-based scripts to automate documentation trail for refurbishment of QuicTest devices for LMG Holdings, as well as testing of the devices during reassembly.
- Designed hardware and firmware for state-of-the-art smart lighting device for Cree Consumer Lighting Products, from concept through testing and manufacturing. Developed test fixture and Windows app that made possible rigorous testing of the device. Established best practices in code development, review and archiving for Cree consumer lighting, and helped share knowledge from the Intelligent Lighting division.
- Worked with developers in the Network Intelligent Lighting division at Cree, providing key firmware elements for next-generation wireless light fixtures.
- Worked with engineers across multiple disciplines to establish need for internal monitoring of robotic systems, then later designed and established successful integration of internal sensors to meet design mandates for Parata Systems, Inc.
- Worked with team to develop vial sensor, resulting in a patent (US20090177316).
- Designed and built several production test fixtures for Parata Systems that allowed key development schedules to be met for a new robotic system.
- Wrote firmware boot-loader code and PC application that allowed over 100 processor boards to be reprogrammed simultaneously over a multi-drop serial network, speeding firmware development.
- Designed the original firmware architecture, along with many of the key device drivers, for the Monitech QuicTest blood alcohol interlock device, which became the flagship product of the company, until it was acquired by LMG Holdings in 2012.
- Have developed C++ classes for handling Windows serial, Winsock and registry interfaces, XML, JSON and Motorola/Intel hex file formats, DES encryption and MD5 hash algorithms.
- Wrote a Linux device driver and JNI that allowed a Java application to control a DSP-based turbo-balancer for Mechtell, Inc.
- Principle architect on Windows-compatible BIOS for Pentium single-board PC, derived from 286 BIOS source code, while consulting for SBS Embedded Computers. Development included initialization and support for PCI mezzanine cards.
- Created a Windows-based automated POS system coordinating up to 64 timers, a central database, a 3rd-party credit-card processing application and a web-based UI for Carolina Pride Car Wash Systems.
- Designed firmware for single and quad mouse/rat blood-pressure devices for Hatteras Instruments. Later stepped in to support and enhance corresponding PC applications written in both Borland C++ and Delphi, updated schematic and PCB layout for surface mount parts, and continue to build, program and test new boards.
- Instrumental in creating next generation of substation voltage regulator by porting existing 16-bit firmware to 32-bit for Siemens.
- Worked with a team of software developers to design the firmware for the Flologic Automatic Water Shutoff System. Responsible for storing time-stamped event messages in a circular buffer in segmented flash memory.

**LMG Holdings, Inc. (Monitech)** - Morrisville, NC

April 2011 – April 2016

**Senior Embedded Systems Engineer**

Firmware development, testing and sustainment for blood alcohol ignition interlock devices. Supported manufacturing process and testing.

**Key Accomplishments:**

- Sole firmware engineer responsible for allowing the QuicTest interlock to remain compliant with quickly-changing NC standards, saving the company millions in potential lost revenue.
- Responsible for ESD testing and modifications, as well as firmware modifications, that allowed the QuicTest device to pass NHTSA certification.
- Developed DLL to allow configuration and control of the FC250 BAIID device through C#, C++, Python and other languages. Responsible for cross-team support to ensure successful launch of supporting business software.
- Designed ad-hoc test fixtures of everything from a car ignition emulator to an audio voice chip analyzer, using a .net micro-based microprocessor board and various opto-isolators, op-amps and other analog parts.
- Helped interview candidates for firmware and hardware positions. Helped hone interview methods and create test questions for candidates.
- Created a universal protocol interface program able to send and parse any command to any of our devices through an XML script file, with machine-specific authentication, allowing quick and secure utility generation for manufacturing or use in the field.
- Assisted in developing stringent regression testing of product, resulting in dramatic improvement on returns.

**Sensus Metering** - Morrisville, NC

April 2008 – April 2011

**Embedded Firmware Engineer**

Sole firmware engineer for the Sensus water division. Worked with remote engineering team, located in N. Raleigh and Uniontown, PA.

**Key Accomplishments:**

- Key member of small team that successfully launched the iPerl water meter into production.
- Collaborated with designers in Cambridge, England. Charged with transferring knowledge of the code to Sensus, for archival and refinement purposes.
- Created an engineering test fixture for the iPerl meter, including firmware, schematic, PCB and Windows front-end application, based around a PIC32 USB microcontroller. Fixture measured micro-amp supply drain at variable voltages in real-time, critical to estimating long-term battery life of the meter.
- Wrote relational database application for tracking root-cause analysis of failures in test meters.
- Assisted and shared resources with co-located electric and gas meter divisions.

**Education**

**BS in Electrical Engineering**, VIRGINIA TECH, Blacksburg, VA