Arthur L. Farnsworth

SUMMARY OF SKILLS

Embedded microprocessor/microcontroller system firmware; Motorola 68HC11, Intel 80x86, and Hitachi H8S/2238 processors; in-house-developed Real Time Operating Systems; serial and other communications interfaces; C, Assembler, FORTRAN, and BASIC languages; documentation; some digital hardware design; HTML, PHP and JavaScript coding; experience on all variety of equipment (scopes, logic analyzers, emulators) used in the course of microprocessor firmware integration; Visio, TurboCAD, OpenOffice and Microsoft Office software experience. Partly fluent in Italian and Spanish.

EDUCATION

Widener University, Chester, Pennsylvania. Bachelor of Science Degree in Engineering. Major: Electrical Engineering.

Penn State University, Great Valley, Pennsylvania. Master of Science Degree in Engineering Science with Emphasis in Computer Design.

Continuing Education: Analog Circuit Design, Fuzzy Logic, Python, BASH scripting and regular expressions, Italian language.

Professional Engineer in the Commonwealth of Pennsylvania

Toastmasters District 38 Division G Director, July 2016 to June 2017.

Coordinated the activities of five area directors within the division and provided them with a supervisory head for counsel, information, and service. Responsible with them for support and development of twenty-seven clubs.

Toastmasters District 38 Area 73 Director, July 2015 to June 2016.

Responsible for five member clubs within the area, representing the district director and the division director to those clubs. An area director makes visits to his clubs, notes areas where improvement is needed, and shares that information with higher-ups and the club, thus bettering the club and the experience of its members via ongoing support and development.

EMBEDDED FIRMWARE DEVELOPMENT EXPERIENCE

Design and development of programmable speech timer based on Arduino development board using C programming language. Schematic, Guide to Operations and flowcharts created as documentation. May 2014-May 2017.

<u>Independent Contractor through Farnsworth Engineering Services</u>, February 1999 to present.

Optium Corporation: C and assembly language code design/development/test/integration for optical transponder project based on Hitachi H8S/2238 microprocessor. Specific processing coded: FLASH memory interface, interrupt-driven asynchronous communications, table-driven command parser. October 2001 to January 2002.

GAI-Tronics Corporation: Designed Motorola 68HC711E9/D3 assembly language firmware for two processor modules that are part of an industrial public address system alarm management device. Real-time operating system enhancements since previous projects. RS-485 communications interface with system controller. Design documentation provided. August 2000 to February 2001.

Uniphase Telecommunications Products: Developed synchronous serial interface firmware and protocol for communication between dual-processor (Motorola 68HC711E9 and 68HC11K4) fiber amplifier rack-mount product. Performed I.C.E. testing, integrated with rack controller, and wrote interface document.

<u>Independent Contractor</u>, February 1997 to June 1998.

Uniphase Telecommunications Products: Perform firmware and hardware upgrades necessary to add proprietary communications protocol used with new RS-485 interface.

ATx Telecom Systems: When the Optical Communications Division of AEL was sold to ATx Telecom Systems, I directly contracted with them to continue work on the optical transmitter. Responsible for redesign of microcontroller (Motorola MC68HC11-based) and display cards, developing schematics (OrCAD), and overhauling firmware (assembly language). Additions to system included LCD, three new communications interfaces, enhanced LASER interface.

<u>Staff Consultant</u>, AEL Industries, Inc., Montgomeryville, Pa. May 1985 to February 1997.

Optical Transmitter: Inherited firmware duties for an optical transmitter for CATV applications that is controlled by an embedded 68HC11 controller. Responsible for overhauling assembly-language code to make user interface improvements and fix feedback loop algorithm. Also lead effort to update processor card design to add new RS-485 communications option.

MANPADS-Q Receiver: Assisted in system design and handled entire software effort. System is a low-cost ruggedized commercial-design receiver to provide aircraft detection data to ground personnel. System software, written in 80x86 assembly language and C, performs signal sampling via A/D converter and signal processing to extract emitters from raw data, and displays threats on a polar display on a laptop computer. Signal collection software is real time, with much processing handled on an interrupt basis.

Piranha II Receiver: Designed and developed software and firmware for a communications receiver and jammer using an 80186 embedded processor. System is controlled by a laptop PC communicating with the embedded processor over an RS-232 link. Laptop software written in Microsoft Quick-BASIC and 8088 assembly language. Embedded controller firmware written in Intel C and 80186 assembly language. Firmware performs real-time signal processing, antenna/receiver control, and presents signal data to the operator via uploads to the laptop. Processor connected to other equipment via parallel drivers (8255).

Ground Jammer Training Set: Designed and developed FORTRAN software to perform fault isolation on a RADAR training system based on the DEC PDP-11/23+ minicomputer. Upgraded the 8080-based embedded device controllers to a newer 80186-based design. This effort involved FORTRAN and assembly language firmware design, coding, and integration. Intel's I^2ICE emulation system and iPAT performance analyzer used for integration. Acted as system site support engineer by assisting in solving problems after delivery. Heavy involvement with military documentation and specifications.

Time Multiplexed Digital Receiver: Responsible for entire software effort for a receiver that tracks frequency-hopping communications systems. System controller is 80486-based PC. All signal processing and control software written in assembly language and C. Also wrote host controller software (C and assembly for 80386-based PC) that handles all operator interfacing, which includes a polar signal display, operator entry of system parameters, mode control, etc.

OTHER ENGINEERING WORK EXPERIENCE

<u>Independent Contractor through Farnsworth Engineering Services</u>, February 1999 to present.

Fairton F.C.I.: Co-authored two vendor request bids for water treatment plant and pump house projects. Responsible for operation of and improvements to power house tool room, including daily check in/out activities and tool maintenance. Improvements: designed and implemented improved tool storage and identification methods including custom shelving and shadow boarding. Instrumental in shop-wide inventory updates. Trained in proper operation of boiler room, which includes three hot water boilers and circulation pumps for hot water; and chillers, circulation pumps and a cooling tower for cold water-based air cooling. Assisted in pump maintenance, boiler interior patching, water treatment plant maintenance. Assisted in upkeep of diesel fueled backup electrical generators, including replacement of day fuel storage tanks. Assisted in upkeep of processor-controlled water treatment system, chlorine analyzer and PH sensor. May 2007 to April 2009.

Cell Phone Express/Point Pleasant Sales: Hired to provide customer database for cellular phone retail store, and stayed on to assist in retail sales and service, customer support, and marketing. Business switched in 2005 from retail store to Internet, and responsibilities changed to designing HTML code for business Web site and eBay advertisements. Summer 2004 to Spring 2006.

Gimpel Software: Acted as engineering technical support person for the popular pc-lint program, reviewing customer feedback and deriving the code changes needed to implement fixes. pc-lint is a very large C-language program. June, July 2003.

<u>Staff Consultant</u>, AEL Industries, Inc., Montgomeryville, Pa. May 1985 to February 1997.

Band 9/10: Wrote Test Requirements Documents that define fault isolation techniques to be used to find faults on digital, servo/analog, and power supply circuit cards by analyzing schematics and interfacing with design engineers.

Automatic Test Station: Developed software package, written in Microsoft QuickBASIC, to run tests on IBM PC-based system utilizing IEEE-488, RS-232, and parallel I/O interfaces. Package provides tool set to generate and execute tests. Generated all documentation.

Modulation Recognizer: Responsible for software design effort for a system which determines modulation type of a received signal. Platform is an 80386-based PC, and all software is written in Microsoft C. Signal generation software developed for a HP PC interfaced to a HP arbitrary waveform generator.

<div align="center"><u>CONTACT INFORMATION</u></div>

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