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SUMMARY

I have designed/implemented/debugged/tested embedded hardware/software since 1979 for a variety of consumer, medical, industrial and scientific measurement products. I am comfortable with design controls necessary for medical device and mission-critical systems development. I have written many technical specifications: product development plans, requirements specifications, design specifications, FMECA, verification and validation tests, quality system SOPs, etc. I have managed small teams of hardware and software engineers from time-to-time.

ENGINEERING SKILLS

Languages and Methods

- Proficient in: Assembly, C and C++ for a broad variety of 8/16/32-bit uProcessors including: Intel 80X86, Freescale 68XXX, 8051-series, Z-80 and derivatives, PIC Series, ATMEGA-series, TI320XX DSP.
- Familiar with: RTOS for embedded control systems. uCOS-II, TI-DSP Bios.
- Design Controls including Development Plans, Requirements, Design, Risk Mgt and V&V Testing.
- Risk Analysis: FMEA/FTA/Root Cause.

Software

- Revision Control: Source-Safe, CVS;
- Electronics CAD: Orcad, Protel;
- Office automation: Word, Excel, Powerpoint, MS-Project, Access, Open Office, Mathcad;

Hardware

- All standard test equipment: Scopes, meters, power supplies, in-circuit emulators, logic analyzers.
 - I have designed and laid-out dozens of uProcessor controlled system PCBs using Protel or Orcad.
 - Experience with designing both line-powered and portable, battery-powered devices.
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EXPERIENCE

Embedded Systems Hardware/Software/Quality Engineer 1998-Present

Kirk Kitchen Consulting, Ypsilanti, Michigan.

- 2008 – Rewrote a compliant Quality System (Quality Manual / SOPs) for Neuro-Fitness LLC. of Seattle WA, a medical device manufacturer, to meet FDA 21 CFR 820 regulations in response to a Form-483 letter from the FDA.
- 2007 – Created design/test documentation (Requirements, Design, Test, FMECA) and managed an FDA 510K submission project for EyePlusPlus of Cleveland OH, a startup developing a vision assistance system for the blind based on X-Scale and H-8 microprocessors.
- 2006 – 2007 Completed/debugged software in C of two TI-DSP 320F28XX series uProcessor-based colorimeters for X-Rite Corp of Grand Rapids, MI. I reverse engineered undocumented firmware to produce retroactive design documents.
- 2006 – Created designed/test documentation for an FDA 510K submission project for Neuro-Fitness LLC of Seattle WA. I reverse engineered undocumented designs to create formal design/test specifications required by FDA medical device regulations and performed V&V tests to validate the design.
- 2005 – 2006 Designed/implemented an AT-MEGA-based micro-tensile tester hardware/software for BISCO, Inc. 100% hardware/firmware design/implementation by me.
- 2002 – 2003 Hardware/firmware of PIC microcontroller-based dental composite curing oven for BISCO, Inc., of Schaumburg IL. 100% hardware/firmware design/implementation by me.
- 1999 – 2000 Wrote firmware in C of a TI-DSP-320C32 based vibration monitor for Ford/Montronix. 100% firmware design/implementation by me.
- Various other embedded projects.

- Sr. Software Engineer** 2000-2002
Aastrom Biosciences, Inc., Ann Arbor, Michigan.
- Hired/managed software engineering team.
 - Developed embedded C++ code for 80X86-based human-therapeutic cell incubator products.
 - Wrote formal (IEEE software engineering standards) specifications: test plans and software requirements and design documents.
- Hardware/Software Engineer** 1992-1998
Independent Consultant
- 1998 Developed hardware/firmware of PIC microcontroller-based dental curing lamp for BISCO Inc., Schaumburg, Il. 100% hardware/firmware design/implementation by me.
 - 1998 Developed prototype energy monitor embedded PC application for Ethicon Endosurgery, division of Johanson&Johnson using QNX/Photon GUI.
 - 1995 – 1998 Developed firmware and design/test specifications for Aastrom Biosciences, Inc., manufacturer of human-therapeutic cell incubator products, for 80x86 & Z-80 derivative based products in C++ and Assembly.
 - 1992 – 1994 Designed/implemented various hardware/firmware for Dynamation, Inc., Manufacturer of industrial safety gas monitors.
 - 1992 – 1993 Designed/implemented hardware/firmware of PIC microcontroller-based surgical illumination system. 100% hardware/firmware design/implementation by me.
- Hardware/Software Engineer** 1986-1992
Electronics Design Alternatives, Inc., Ann Arbor, Michigan.
- I started up EDA, Inc. in 1986 to provide hardware/software consulting services. I managed four engineers and other responsibilities of small company ownership.
 - Designed/implemented hardware/software for a variety of embedded systems such as: set-top TV tuners, medical diagnostic equipment, scientific measurement equipment, industrial environmental monitors using 68HC11, 6803, 8051, 80X86. Companies include: Coy Laboratory Products of Grass Lake, MI; Diamond General Development Corp of Ann Arbor, MI; Dynamation, Inc., Ann Arbor, MI; ERGCO, Inc. of Ann Arbor, MI; Fiberoptic Sensor Systems Inc., of Ann Arbor, MI; Mallinckrodt Sensor Systems of Ann Arbor, MI; Matrix Technologies of Ann Arbor, MI; Steelcase Corp., of Grand Rapids, MI; Videoview of Laguna Beach, CA.
- Hardware/Software Engineer** 1983-1986
Bell Northern Research Inc., Ann Arbor, Michigan.
- Implemented/tested firmware/software/hardware for a 68000-based workstation product that had integrated voice/data communication. Used the XMS-Pascal operating system proprietary to Bell Northern Research.
- Software Engineer** 1979-1983
Child Inc., Ann Arbor, Michigan.
- Implemented computer graphics firmware and software tools in Assembly and FORTH for TI-9900, 68000 and IBM-Series-1 Minicomputer.

EDUCATION

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| 1975-1976 | Hutchinson Community College, Hutchinson, Kansas.
Pre-engineering curriculum. |
| 1976-1980 | University of Kansas, Lawrence Kansas.
Computer Engineering. |
| 1982-1984 | Eastern Michigan University, Ypsilanti, Michigan.
courses in Biology / Organic Chemistry. |
| 2000 | Washtenaw Community College, Ann Arbor, Michigan.
Continuing Education Course in UML. |

EMBEDDED SYSTEMS DESIGN EXPERIENCE

Description	Year	uProcessor	Language	Battery Powered?	%Responsibility		Safety Critical?
					Hardware	Software	
Graphics Display Generator	1979-80	TI9900	Assy, FORTH			50	
Embedded Development System	1980-82	MC68000	Assy, FORTH			50	
Television Parental Control	1982	RCA-1802	Assembly			100	
Television Program Scheduler	1983	RCA-1802	Assembly			100	
Office Computing	1983-86	MC68000	Assy, Pascal				
CATV Tuner for Pay Per View	1984	Logic	ROM-based		100	100	
CATV PPV subsystem	1984	68HC05	Assembly		100	100	
Industrial Safety Gas Monitor	1986-88	68HC11	Assy, FORTH	X		100	X
CATV Tuner for Pay Per View	1988-89	Intel 80C51	Assembly		25	25	
Muscle Strength Tester	1989	Intel 80C51	Assy, FORTH		25	100	
CATV Tuner for Pay Per View	1990	68HC03	Assembly, C		25	100	
Temperature Data Logger	1990	68HC03	Assembly, C	X	25	100	
DNA Thermocycler	1991-92	68HC03	Assembly, C		10	100	
Industrial Safety Gas Monitor	1993-94	68HC11	Assy, FORTH	X	100	10	X
Industrial Safety Gas Monitor	1993	Logic	N/A	X	100	N/A	X
Industrial Safety Gas Monitor	1994	PIC14C57	Assembly		100	100	X
Halogen Headlamp Battery Pack	1994	PIC16C71	Assembly	X	100	100	
Cell Therapy Incubator	1995-97	Z80 derivative	Assembly			25	X
Cell Therapy Harvester	1995-97	Z80 derivative	Assembly			25	X
Endosurgery Energy Monitor	1998	80X86	QNX/C		OTS	10	
Dental Curing Lamp	1998	PIC16C73	Assembly		100	100	
Cell Therapy Incubator	1997-98	80X86	C++			10	X
Cell Therapy Harvester	1997-98	80X86	C++			10	X
Machine Tool Monitor	99-2000	TI320C32	C		OTS	100	X
Cell Therapy Incubator	2000-02	80X86	C++			10	X
Cell Therapy Harvester	2000-02	80X86	C++			10	X
Dental Curing Oven	2003-04	PIC16C73	Assembly		100	100	
Fuel Cell Data Acquisition System	2003	PIC16C74	Vesta-Basic		OTS	100	
Microtensile Tester	2005	ATMEGA-128	C		OTS	100	
Dental Composite Colorimeter	2006	TI320F2812	C	X		10	
Paint Colorimeter	2006-07	TI320F2811	C	X		10	

OTS = Off The Shelf