

Résumé: [Michael T. Nelson, The Embedded Systems Specialist](#)

Objective: software engineering for development of embedded systems with real-time performance

Experience: 25 years as a consultant and contract software engineer, 30 years in industry as hardware and software engineer, 6 years in military electronics

Skills: object-oriented analysis and design, hardware and software integration for real-time systems, team leadership, project management, technical documentation, extensive background in digital and analog hardware design

Applications: real-time embedded systems, hardware/software co-simulation environments, design verification and diagnostic software, process control, motion control, robotics, signal processing, image processing, video, audio, data compression, encryption, TCP/IP, token ring, and other network protocols.

Languages: C / C++, [ARM](#), [Freescale](#), [TI MSP430](#), [MIPS RISC](#), [Intel](#) Microcontroller Assembly Languages

Embedded Operating Systems: [Micrium](#) uC/OS-II, [Express Logic](#) ThreadX, WindRiver [VxWorks](#), Microsoft [Embedded Windows](#), MS-DOS, [Linux](#), [Unix](#), [Solaris](#)

Development Environments: IAR [Embedded Workbench](#), IAR [visualSTATE](#) Microsoft [Visual Studio](#), WindRiver [Workbench](#), GNU

Recent Projects:

Microcontroller Firmware, [Proteus Biomedical](#), December 2008 to March 2009

Designed and coded boot loader, flash file system, and application firmware for [TI MSP430](#) microcontroller.

Microcontroller Firmware, [Tigo Energy](#), April 2007 to September 2008

Specified, procured, and programmed [ARM](#) SoC microcontroller to convert DC power from photovoltaic panel to synthesized 60 Hz AC using high frequency pulse width modulators (PWMs) with closed-loop control for maximum power point tracking (MPPT).

Embedded Systems Engineering, [IAR Systems](#), March 2005 to April 2007

Created example projects for embedded systems hardware kits and software development tools for [ARM](#), including [UML](#) state machine design. Technical support, training, and sales support.

Design Verification and Manufacturing Diagnostics, Airespace (now [Cisco Systems](#)), July 2004 to November 2004

Specified, designed, and implemented hardware and software to verify design of wireless access point RF, network, and power supply circuits. Ported engineering test software to manufacturing.

Robotic Wafer Handler Systems Engineering, [KLA-Tencor](#), March 2004 to June 2004

Engineering solutions for cost-reduction and reliability improvement of latest robotic wafer handling technology.

Distributed Power Supply Control Software, [Extreme Networks](#), July 2003 to April 2004

Specified, designed, and implemented real-time embedded software for control and management of distributed power supplies for a fault-tolerant server application. Management software runs under Linux on MIPS processors and communicates with multiple [TI MSP430](#) embedded controllers via I²C interfaces.

Robotic Wafer Handler Systems Engineering, [KLA-Tencor](#), January 2002 to October 2002

Consulted on architecture of next generation of robotic wafer handlers; evaluated nascent technologies. Integrated off-the-shelf components from various manufacturers to improve reliability, throughput, cleanliness, and cost-effectiveness of wafer handlers. Incorporated [SEMI-standard](#) eDiagnostic features in hardware and software.

VPN Router Design Verification and Manufacturing Diagnostics, [Cisco Systems](#), March 2000 to December 2000

Wrote system level diagnostics in a hardware and software co-simulation environment for a Virtual Private Network Router. Model included multiple closely-coupled Motorola PowerPC processors, cache coherency, multiple DMA channels, fast and wide shared memory interfaces, attached encryption accelerators and network interfaces.

Video/Audio Compressor, Multiplexer, Encryption Software, Compression Labs, June 1992 to December 1993

As Software Manager for the [DirecTV](#) project, wrote detailed system interface and software design specifications, hired and directed team. Selected software and hardware development tools. Implemented embedded systems with AMX-68K operating system in C and assembly languages for the MC68302. Built fault-tolerant supervisory system with MS-DOS, real-time kernel, and the C language on the IBM PC. Designed and coded an automated test harness using a client-server architecture on SUN workstations, IBM PC's, and embedded systems.

Molecular Beam Epitaxy Process Control Software, [Intevac](#), June 1990 to November 1991

Installed pSOS+ multitasking kernel on MVME-147S in MC68030 assembly language. Developed real-time process control recipe execution and status reporting. Wrote SECS-I, SECS-II, and SECS-GEM protocol drivers. Built an automated script driven test harness.

Other Projects:

Project Description	Organization	Term
Optical Multiplexer Manufacturing Diagnostics	Centerpoint	Dec.'00 to Oct.'01
Optical Networking Line Interface Diagnostics	Cosine Communications	Nov.'99 to Mar.'00
Communications Protocol Design and Development	WebTV (now MSN TV)	Nov.'98 to Jun.'99
Diagnostic Software Development Tools	DiagTools	Oct.'98 to Oct.'99
Satellite Modem Design Verification	ComTier	Aug.'97 to Apr.'99
Token Ring Network Adapter Diagnostics	3Com	Mar.'97 to Feb.'98
Cable Modem Design Verification	Com21	Feb.'96 to Jul.'96
Ethernet to ServerNet Protocol Converter Design Verification	Tandem Computers (now HP Non-Stop Computing)	Jan.'95 to Dec.'95
Embedded SNMP Agent	Verilink	Jul.'94 to Jan.'95
Project Management	Octel (now Avaya)	Jan.'94 to Jul.'94
Wide Area Network Management	StrataCom (now Cisco Systems)	Mar.'92 to May'92
Point of Sale Keyboard, Card Reader, and Display	ICL (now Fujitsu Transaction Solutions)	Nov.'89 to Jul.'90
Magneto-Optical Read/Write Head and Media Tester	ProQuip	Sep.'89 to Oct.'89
Human Factors and Advanced Mobility Test Bed	FMC (now United Defense)	Feb.'89 to Aug.'89
Process Controller and Automated Wafer Handler	General Signal ThinFilm	Jun.'88 to Feb.'89
Control System Diagnostics and Data Logging	Bay Area Rapid Transit	Oct.'87 to Jun.'88
IBM PC System Security and Encryption Adapter	CipherTec	Jun.'86 to Sep.'87
Telecommunications Network Automated Test System	Lear-Siegler	Oct.'86 to Jun.'87
Flat-Bed Scanner for Image Processing and OCR	Datacopy Corporation (now Ricoh)	Feb.'86 to Aug.'86
Power Line Disturbance Monitor	Dranetz-BMI	Nov.'84 to Feb.'86
Office Automation, LAN, WAN, Distributed Database	Seamen's Union, Philippines	Jan.'83 to Sep.'84
Automated Integrated Circuit Packaging System	Deltron, Philippines	Feb.'83 to Sep.'84

Education:

Subject	School	Term
C++ for Object Oriented Programming	University of California Extension	Feb.'94 to Aug.'96
Structured Software Engineering	Santa Clara University	Sep.'80 to Jun.'81
Digital and Analog Circuit Analysis and Design	Santa Clara University	Jul.'79 to Jun.'80
Microprocessor-based Systems Architecture	Santa Clara University	Jul.'78 to Jun.'79
Analog and Digital Electronics	U.S.Navy Technical Schools	Sep.'72 to Nov.'77