

Richard Mincher

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Objective: Senior-level embedded engineering position

Employment

Rift Zone Technologies, LLC, Cupertino, CA. 6/01-Present
Managing Member / Embedded Software & Systems Consulting

Cloudshield Technologies, now subsidiary of SAIC. Sunnyvale, CA.

- Maintained RedBoot bootloader, added enhanced TFTP boot functionality, and FPGA dual port memory interface and protocols for IPMI (Intelligent Platform Management Interface), and updated to support new products.
- Wrote driver for proprietary FPGA-based Ethernet controller for RedBoot, embedded Linux, and U-Boot.
- Wrote FRU (Field Replaceable Unit) record parser/compiler to generate binary images for flash and libraries to read and write binary FRU images.
- Created sysfs module to support custom FPGA-based hardware for embedded Linux and boot scripts to configure network interfaces and other system parameters from FRUs and U-Boot non-volatile memory.
- Created IPMI over LAN agent for Linux including session authentication and corresponding library for application development.
- Created custom Verilog blocks for Picoblaze (Xilinx 8-bit soft core) based multi-port serial interface and firmware to offload processing of proprietary RS-485 based protocols for communicating within a blade chassis, and Linux driver to allow applications to communicate over RS-485 interface.
- Added code to U-Boot to allow fallback booting, booting of encrypted images, and test and use board specific hardware.
- Created chassis and blade management tasks to monitor sensors and report errors (voltage, temperature, insertion/removal), to monitor power supply status (SMBus) and fan control.
- Board bring up for multiple FPGA/PowerPC based blades and management modules including U-Boot and embedded Linux.

Fyrestorm, assets acquired by Exar. Sunnyvale, CA.

- Co-developed PowerPC code using Xilinx EDK to qualify and test state of the art switching power supply controllers. Specified and implemented networking connection to test system using Xilinx Ethernet core and LWIP stack. Implemented custom TCP-based stream clients for diagnostics and control of system from HP/Agilent test platform. Created clients for NTP (network time protocol) and TFTP. Implemented code to parse and play various diagnostic analog format files to ADC.
- Diagnosed and debugged issues with released Xilinx libraries for SYSACE chip and FAT file system using XMD and GDB. Found and fixed problems relating to the extended attribute field of FAT directory entries and problems relating to multiple FATs getting out of sync when written files exceeded a single cluster.
- Wrote assembler for custom processor used for high-speed sequencing of test logic.
- Assumed maintenance of Verilog Xilinx FPGA code using Synplify Pro and ISE. Added additional functionality to existing Verilog code for new tests including interface to intelligent load board that included health status checking (measurement of supplies) through SPI-based ADC and adjustment of supplies.
- Designed and implemented Verilog CPLD code to interface to test system using Xilinx ISE to provide control functionality and user interface to load board.

- Implemented Microchip PIC-based watchdog timer to guard against test system lockup. Controlled Xilinx SYSACE chip to provide for sequencing of multiple sets of boot code.
- Performed bring up and debug of test subsystem hardware and software using Xilinx Chipscope, Impact and various test equipment.
- Specified and implemented test subsystem for checking continuity, leakage and shorts of switching power supply chips. Subsystem connects to Virtex 2 Pro using parallel interface and consists of 8 networked Spartan III FPGAs; each FPGA consisting of 4 ADCs, 1 DAC and control logic. Microblaze code written to communicate with main PowerPC code and provide flexible parametric sequencing of pin electronics and measurement.
- Wrote and simulated Verilog code to add new instruction to custom test processor to allow control/adjustment of DUT (device under test) test voltages during high-speed test sequencing.
- Created GUI application using Borland C++ Builder to allow customers to configure and generate EEPROM parameter image for complex switching power supply chip including failure actions, startup and shutdown sequences and power supply parameters.
- Created PC application as front end for custom in-house test jig. Application provided text formatting (color, size and face) as well as capturing test data and handing it off to GNUPlot for display. Application also worked with custom file system (partition) allowing management of datasets and translation of datasets to native PC files for analysis by MATLAB.
- Developed embedded 8051-based code for high-efficiency power supply chip to provide functionality for low power PDA-like applications including asynchronous, SPI and I2C-based communications interface, resistive touch screen interface, matrix keyboard, intelligent LED control, battery and power supply monitoring, and battery charging for lithium, NiCD and NiMH batteries.

Apple Computer, Inc. Cupertino, CA.

- Developed Macintosh OS X (IOKit) driver for prototype PCI Express (PCIe) card containing Micronas nGENE PCIe controller and MPEG video and audio decoder. Application provides single transport stream in and driver provides decoded audio stream and 1080i frames out.
- Developed Macintosh OS X (IOKit) driver for prototype PCI Express (PCIe) card containing Micronas nGENE PCIe controller, multiple I2C-controlled ATSC decoders and tuners to provide 4 unique transport streams to end-user application.

Impeva Labs, acquired by Cubic Corporation. Mountain View, CA.

- Developed Windows CE (Pocket PC)-based application running on ruggedized handheld device to be used for tracking cargo containers. Application communicated with LASER range finder and proprietary hardware via Bluetooth and serial links.

Richard Mincher Consulting. Cupertino, CA. 6/90-Present
Owner

Equal Networks, Sunnyvale, CA.

- Developed ARM and SPARC firmware for Wi-Fi-based, small, battery operated low-power environmental and power sensors including over-the-air parameter updating.
- Developed AC power measurement code using Analog Devices ADE7763.

Array Converter, Sunnyvale, CA.

- Integrated Echelon power line communications module with dsPIC based solar power converter.
- Developed robust bootloader to work over power line communications.
- Developed flash library for dsPIC.
- Developed prototype ACTEL SmartFusion based FPGA and freeRTOS-based firmware for switching power supply.

Mainbrace Corporation, Sunnyvale, CA.

- Developed Windows CE drivers for MMC (Multi-Media Cards), Ethernet, PC Card, LCD Display, Serial, and CPCI, and power management for MIPS and ARM720 platforms.
- Designed C source code obfuscator to allow release of source code that would compile and was functional but not readable.

Philips Semiconductor, Sunnyvale, CA.

- Investigated smart cards and development of reader under Windows CE.
- Reverse-engineered and developed Windows CE driver for WebTV IR keyboard under CEPC/MIPS and HPAK.
- Developed Windows CE drivers and HAL (hardware adaptation layer) firmware for Philips Poseidon 2.0 MIPS-based processor.
- Provided software support for Microsoft "ODO" Windows CE development platform for emulation of new peripheral development.
- Provided software support for QuickTurn emulation of MIPS PR3930 processor including diagnostics and low-level drivers.

Flowpoint Corporation, Los Gatos, CA.

- Wrote Macintosh-based configuration application for ISDN router (UDP, SNMP).
- Implemented drivers for POTS interface of 68360-based ISDN router including call progress tone generation.
- Wrote Async and SDLC drivers for Apple Serial NB card.
- Wrote 68360 Ethernet, HDLC, and Async drivers for p/SOS development environment.

Advanced Pyrotechnic Systems, LLC. Morgan Hill, CA. 10/01-7/06

Founder / Managing Member

- Developed Palm OS and Windows applications for the electrical firing and synchronization of commercial fireworks.
- Developed Microchip PIC-based network controller for the distribution of timing cues to remote firing modules including communication to host controller, FSK time synchronization, H-Bridge power management and communications protocols and front panel input and display control.
- Developed Microchip PIC-based firing module to respond to network cues for controlling high-current FETs for the firing of squibs (electric matches) and provided responses as to current continuity status.
- Developed Microchip PIC-based factory/production tester software to aid in the manufacturing and debugging of products.
- Developed wireless "bridge" firmware to allow fireworks network to be remotely extended over 1/2 mile without wires via proprietary network and hardware interface.

Mainbrace Corporation / BSquare Corporation Silicon Valley Division. Sunnyvale, CA. 2/99-5/01

Senior Software Architect

- Developed flash/ROM-based bootstrap loader code to load compressed Windows CE kernel images from Disk-on-chip to SDRAM.
- Developed low-level bootloader, OAL code, and Windows CE drivers for Touch, keyboard, SPI, serial, and PC Card/Compact Flash on Intel SA1110 processor / MediaQ Tenerife (MQ1132).
- Developed OAL and Windows CE drivers for Toshiba 3922 MIPS processor.
- Developed Microchip PIC-based peripheral controller for Windows CE devices including resistive touch screen processing, battery measurement, keyboard scanning, IO

- extensions, and power-efficient alarm indicator. Interfaced via SPI and UART to ARM720, MIPS3922, and StrongARM processors.
- Developed Windows CE drivers and OAL for ARM720-based Microsoft WebTelephone device.
 - Developed LinkUp L7205 MMC-based boot loader that fit in master boot record to allow compressed system/code images to be loaded from FAT16 formatted multimedia card to SDRAM at power up.

Apple Computer, Inc. Cupertino, CA. 5/86-7/97
Staff Engineer

Advanced Technology Group

- Developed firmware for Motorola MPC860-based PCMCIA wireless bridge including minimal IP stack and SNMP using ADS860 development system and Metrowerks PowerPC EABI tools.
- Designed and implemented PC Card Ethernet/Wireless "bridge" based on Motorola 68EN360 for 2.39GHz network including MAC layer protocols, embedded AppleTalk stack, drivers, diagnostics, command line interface, statistics gathering, and field-upgradeable FLASH firmware.
- Wrote driver and test/development software for 8Mb wireless 2.39GHz LAN PC Card.
- Wrote Verilog implementation of PC Card interface, Serial EEPROM state machine and several MAC protocol blocks for wireless ASIC.
- Wrote driver and ASIC test software for custom IrDA ASIC (through 4Mb).
- Wrote test application and Xilinx /Altera downloader for wireless ASIC.
- Implemented Macintosh Native PCI driver for Cirrus Logic GD54M30 graphics controller.
- Wrote PC Card Ethernet driver for Macintosh PowerBook.
- Migrated serial-attached wireless LAN adapter to PC Card interface including Macintosh driver and implemented field upgradeable FLASH system.
- Developed 68302-based firmware for frequency-hopping Wireless LAN (AKA Frogger) including MAC Layer protocols, power management, encryption (RC4), error-correction (Reed-Soloman, BCH), and 1Mb serial synchronous interface.
- Developed 6502-based wireless prototype firmware including debugger for using Proxim radio.

Communications and Networking Group

- Implemented Macintosh AS/400 database front-end application.
- Created Macintosh-based network analyzer for TokenRing and Ethernet.
- Co-designed and implemented A/ROSE real-time multitasking kernel.
- Designed and implemented control panel for MacDFT (IBM 3270 Terminal Emulator).
- Prototyped IBM DIA application/protocol stack on Macintosh.
- Designed and implemented MCP/NuBus downloader routines.
- Designed and implemented ADSP/AppleTalk to A/ROSE message gateway.
- Implemented TokenRing and SDLC Macintosh drivers for IBM 3270 and IBM LU6.2.
- Designed and implemented Communications Toolbox tool for Serial NB card.
- Co-designed and brought up Mac II Serial NB card.

Packet Technologies, Inc. Cupertino, CA. 6/85-9/85
Member of Technical Staff (Internship)

- Developed electronic mail software for cable television via set-top converter.
- Diagnosed/Fixed problems with existing cable head end software.

University Of Minnesota Computer Center. Lauderdale, MN. 6/83-6/85
Systems Software Programmer

- Maintained and enhanced Control Data NOS operating system and interactive network software (IAFEX).
- Enhanced PDP-11 asynchronous front-end processor.
- Provided walk-in consulting services to end-users.

Minnesota Educational Computing Consortium. St. Paul, MN. 6/79-6/83

Senior Programmer Paraprofessional

- Supported and enhanced Control Data KRONOS/NOS operating system and networking software.
- Developed crash analyzer for IAFEX network software.

Education

- University of Minnesota, Institute of Technology.
- Bachelor of Computer Science, 1986.
- Major: Computer Science, Data Communication.

Languages, Development Systems and Operating Systems

- C, Verilog, various assemblers.
- Metrowerks, Visual Studio, Borland, XCODE, MPW, TurboPascal/C, GCC, ORCAD.
- MIPS, ARM, PIC/dsPIC, 683XX/680X0, PowerPC, 68HC11, Z80, 65C02, Compass, CAL, VAX, 8085, and PDP-11 assembly languages.
- Palm, Macintosh, Windows CE, Windows NT/2000/XP/7, A/ROSE, Unix/Linux, Kronos/NOS (Control Data), COS (Cray), DOS, PLATO.

Patents

- U.S. Patent #5,444,781 "Method and Apparatus for Decryption using Cache Storage"
- U.S. Patent #5,408,506 "Distributed Time Synchronization System and Method"
- U.S. Patent #5,245,508 "Method and Apparatus for Variable-Overhead Cached Encryption"
- U.S. Patent #5,604,869 "System and Method for Sending and Responding to Information Requests in a Communications Network"
- U.S. Patent #6,031,833 "Method and System for Increasing Throughput in a Wireless Local Area Network"
- U.S. Patent #6,069,887 "Method and System for Synchronization in a Wireless Local Area Network"
- U.S. Patent Application 20110298301 "Apparatus, system, and method having a Wi-Fi compatible alternating current (ac) power circuit module"

Continued Education

- Wireless RF System Design, Besser Associates.
January 1996, Los Altos, CA.

Publications

- "Blade Management Controller Rides FPGA Processor", Xilinx Xcell journal, Q3 2009, Issue 68, pp 14 – 20