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Skill Summary:

I have 28 years electronics design experience as a full time and consulting engineer in the following areas.

Electronics, Software, and Mechanical Design

- Circuit Design experience from concept, to schematic, PCB Layout, fabrication, testing and production.
- Analog and Digital Design. Experience using PSpice for analog and mixed signal circuit analysis.
- Strong experience in EMI emissions and regulatory issues including FCC/CISPRR certification process.
- Experience with high-speed digital interfaces (PCIe, MII to SGMII, high speed serial, 1GHz + bus speeds).
- FPGA and CPLD design experience with Xilinx & Altera, using Verilog and custom languages.
- Programming experience with Embedded, Windows, and MacOS/iOS, using C, C++, Objective-C, and Swift.
- Familiar with OrCAD and Altium design tools including OrCAD CIS database and design process implementation, creation of parts database, training and documentation for engineering staff.
- PCB layout design skills using Pads PCB and Allegro.
- Mechanical design experience using SoildWorks, Mastercam, and other CAD/CAE tools.
- Own my own test equipment including oscilloscopes, logic analyzer, environmental test chamber and more.
- I own a CNC machine shop for prototyping including 3 axis and 5 axis CNC Mill. CNC Lathe, and QA tools.

General Skills

- Praised for having excellent communication, presentation, and writing skills.
- Fast learner, good teacher, and detail oriented. This has led to my diverse skill set.
- Team oriented engineer and manager who motivates project teams toward successful products.
- Computer guru, 37 years experience with computers (Windows, Linux/Unix, Macintosh, programming, network architecture, protocols, applications, system administration, and engineering tools).

Experience Summary:

(see pages 2-4 for specific job experience)

Embedded Hardware Design

- Experience with various embedded processors (8-bit, 16-bit, & 32-bit).
- Software design for embedded applications.
- Low power, battery operated circuits, and micro-power battery backed circuit design.
- Embedded backplane and peripheral bus design.
- Analog design, sensors, signal conditioning, ADC/DAC, and power supply design.

Consumer Electronics and Multimedia Hardware Design

- Embedded processor and multimedia designs for cell phones, PDAs, and hand held devices - including audio, video, LCD, and peripherals.
- Analog design experience with op-amps, CODECs, power supplies, and other basic analog circuits.
- Design of low power, primary and rechargeable battery products including battery-charging circuits.
- PC/Mobile audio and multimedia controllers including all multimedia functions of modern devices.

Networking Hardware, DSL, and Cable Modem Design

- Design of fault tolerant boards for 10/100 and Gigabit Ethernet traffic concentrators, including high-speed memory (Rambus, SDRAM, and ZBT SRAM), network processors, high-speed serial switch fabric, and embedded control processors.
- Design of Ethernet controller boards for add in PC cards and network infrastructure equipment.
- Cable Modem head end design and DSL cable modem design.

Architecture Definition and System Design

- Skilled at architecture definition with focus on cost, user interface, and function.
- "Feasibility of Design" studies for industrial and consumer products including BOM, cost analysis, mechanical and industrial design constraints.
- System on Chip architecture definition for ASIC and FPGA applications.
- Biometric Identification experience with Fingerprint and Voice Recognition products.
- Hot swap and redundant architecture experience.

Applications Engineering

- Provided customer applications support including application notes, data sheets, reference designs, phone support, and FAE/Customer training.
- Design of boards for turnkey, ready to manufacture kits (including schematics, PCB layout, emissions approval, and BOM intended for large scale production by OEM manufacturing houses).

Job	**Akhara Design**, San Jose, CA	
Experience:	**CONSULTANT – OWNER / SENIOR DESIGN ENGINEER**	**Jan. 2000 – Current**

I have worked as an independent consulting engineer since January 2000. Many of the companies listed below were consulting projects I worked on.

Akhara Design includes mainly electrical design, but also mechanical design and fabrication skillsets including a CNC machine shop used for mechanical prototyping.

I provide my own software tools, lab, and test equipment including basic environmental testing.

Only major consulting projects are listed below. Fabrication and CNC machining projects are not listed.

OttoQ, Cupertino, CA
CONSULTANT – SENIOR DESIGN ENGINEER   **Mar. 2016 – Jul. 2017**

Hardware design of magnetic sensor based parking lot monitors. Bluetooth RF design using Nordic and TI microprocessors, and Honeywell and Memsic 3 axis magnetic sensors used to detect presence of a vehicle.

Battery based power supplies for 5 year field life.

Mechanical design and testing of environmentally sealed plastic enclosures. Mechanical prototyping.

Managed manufacturing process for ramp up of customer roll outs.

Voler Systems, Sunnyvale, CA
CONSULTANT – SENIOR DESIGN ENGINEER   **Sep. 2014 – Sep. 2015**

Fast paced consulting firm where I worked on multiple projects including mobile and wearable devices, medical devices, network infrastructure products, and embedded designs.

Managed a team of engineers as needed for projects.

Responsible for analog and digital designs including pico-ampere sense circuit, industrial monitoring, power supplies, Ethernet Switch Fabric and an Ethernet based backplane, microcontrollers, and cellular chipsets.

Obvius/Leviton, Hillsboro, OR
CONSULTANT - DESIGN ENGINEER   **Nov. 2001 - 2014**

Responsible for design and testing of embedded products for Obvius' monitoring system, including Ethernet, RS-232, RS-485, RF networking, LCD display, battery backup, and analog inputs.

Used PSpice to design and analyze a multi-port DVM function for analog and digital input monitoring.

Designs implemented with ARM7/ARM9 and Rabbit Semiconductor based embedded processors.

Responsible for ARM7 Software written in C.

Responsible for bed of nails test systems including hardware and software design.

Evaluated and designed various switching and linear power supplies including PSpice simulation.

Performed cost/benefit analysis of various designs and features for Obvius products.

Gyration, Inc., Saratoga, CA
CONSULTANT – Design Engineer   **Jul. 2004 – Jun. 2005**

Responsible for design of several components of a wireless mouse, battery charger, keyboard, and USB RF receiver, including follow-on products and accessories.

Followed product from early design through testing and overseas manufacturing support.

Designed product using TI MSP430 Processor Family and Cypress WirelessUSB and PSoC Families.

Power Integrations, San Jose, CA
CONSULTANT - OrCAD CIS Implementation & Training   **Nov. 2003 - Mar. 2004**

Provided consultation regarding implementation of PI's OrCAD CIS database and design process.

Wrote reference materials and provided training for engineering staff and FAEs.

Flextronics Corporation, Milpitas, CA
CONSULTANT - DESIGN ENGINEER   **Oct. 2003 - Dec. 2003**

Wrote a design feasibility study for a consumer level pocket sized security device for biometric fingerprint and voice recognition, including a LI-ION battery powered, ARM based design with flash memory, fingerprint sensor, and voice recognition capability.

The report included cost analysis for high volume production, battery budget according to different usage patterns, and investigation into other possible features such as a breathalyzer and USB flash disk function.

MediaQ Incorporated (now nVidia), Santa Clara, CA
CONSULTANT - DESIGN ENGINEER **May - Oct. 2002, Jul. - Aug. 2003**
- Designed, documented and debugged several evaluation and debug boards for MediaQ silicon products including a seven slot back plane (including signal integrity issues), an Ethernet/Super I/O Peripheral card, a PCI interface adapter and an evaluation board for MediaQ's newest silicon.
- Defined feature requirements for MediaQ evaluation and debug boards.
- The boards implemented common functions for cell phone and PDA flat panel and multimedia acceleration.
- Implemented component database (OrCAD CIS) to assist in BOM creation and defined design process around the database.

Ikanos Communications, Fremont, CA
CONSULTANT - DESIGN ENGINEER **May 2003 - July 2003**
- Designed a debug and evaluation board for Ikanos' next generation xDSL chip set, including interfaces for different memory systems, debug aids, external CPU integration, and interface variations for Ikanos' physical layer interface devices for DSL applications.

Leopard Logic, Cupertino, CA
SENIOR SYSTEMS ENGINEER **Jan. - Mar. 2002**
- Defined a RapidIO Interface for FPGA and ASIC applications. Wrote a specification for development of a RapidIO core for System on Chip designs.
- Presented RapidIO architecture to Leopard's key customer.
- Examined Leopard Logic FPGA development tools and documentation and provided bug reports and feedback.

Inkra Networks, Fremont, CA
CONSULTANT - DESIGN ENGINEER **Jan. - Oct. 2001**
- Designed and managed two multi-function boards for Inkra's carrier system for Internet data centers.
- Board included: high-speed back plane switch fabric, network processors, Rambus memory, 10/100 and Gigabit Ethernet, MPC860 CPU, SDRAM, ZBT SRAM, CPLD, CSIX and Focus bus interfaces.
- System design frequencies include: 2.65 GHz back plane switch fabric, 1.25 GHz PECL Gigabit Ethernet interface (TBI), 400 MHz (800 Mb/s) Rambus, 100 MHz ZBT SRAM, 40 MHz CPU sub-system.
- Designed MPC860 CPU sub-system including interfacing incompatible bus architectures to CPU.
- Assisted with creation of component database (OrCAD CIS) to streamline design process.
- Created reliable process in OrCAD allowing two boards to be created from one schematic.

Luxxon Corporation, San Jose, CA
CONSULTANT - DESIGN ENGINEER **1999 - 2000**
- Main architect for MultiMediaCard (MMC) interface for Luxxon's LUX2 Multimedia Processor (for wireless and hand held devices). Responsibilities included debug and MMC compliance testing.
- Designed an FPGA development board for the LUX2. Responsible for design, fabrication, purchasing parts, documentation, and design of add-on daughter boards.
- Provided early system architecture for Luxxon's Mediator Streaming System (a streaming media technology for wireless and mobile devices). Responsibilities included hot swap and redundancy as well as bandwidth demands in a video encoder/decoder application.

Terayon Communication Systems, Santa Clara, CA
MTS, DESIGN ENGINEER **1998 - 1999**
- Designed multiple sub-systems on a complex Cable Modem head end product including: CPU interface, hot swap, redundancy, Compact PCI interface, power supply, interface to RF circuits and high-speed memory interface. Design effort encompassed three separate board designs for IC and architecture verification and design specifications for final products.
- Designed FPGA based test bed for DOCSIS upstream packet processor, interfaced to a Motorola MPC8260 embedded processor. Responsibilities included FPGA architecture definition, FPGA design, PCB circuit design, and mechanical issues.
- Wrote requirements and design specifications for above-mentioned projects.
- Defined and documented better procedures for Terayon's design process.

Chromatic Research, VLSI System Products, Sunnyvale, CA
MTS, DESIGN ENGINEER   **1996 - 1998**
   Designed processor based multimedia boards for the consumer and OEM market. Designs included CODECs for audio, modem, display RAMDAC, NTSC Video in and out and more.
   High frequency design and PCB layout experience with 300 MHz Rambus memory bus and 125 MHz multimedia processor.
   Successful completion of FCC/CISPRR EMI emissions certification of above systems.

Advanced Micro Devices, Corporate Systems Engineering, Sunnyvale, CA
DESIGN ENGINEER   **1994 - 1996**
   Designed PC Audio boards for the consumer and OEM market. The boards were ready to manufacture design kits for AMD customers.
   Mastered design of 2 and 4 layer PCBs with mixed analog and digital components.
   Provided customer support on AMD's full product line through phone hotline including LAN/Ethernet devices, Flash memory, CPLD (Mach family), PLD products, and AMD processors.

National Semiconductor Corp., Local Area Networks, Santa Clara, CA
APPLICATIONS ENGINEER   **1990 - 1994**
   Main architect of Ethernet chip. Conceived and designed the bus architecture, DMA, data path, FIFOs, system architecture and system software interface.
   Designed mixed signal digital and analog PCBs for evaluation and demonstration purposes.
   Presented product and technical information to customers and FAEs.

Education: B.S. Electrical and Electronics Engineering, June 1990, Oregon State University