# RESUME

GREG BENDER
Electro-Mechanical Design Engineer
P.O. Box 7837
Stockton, CA 95267
Email: greg@future-spark.com

## EXPERTISE:

Innovations & New Product Development
Instrumentation & Control Systems
High Power Analog & SMPS Drives
Specialty PCB's & Industrial Design

## PROFESSIONAL SUMMARY:

I am a perceptive Electro-Mechanical Design Engineer with a background in Physics, EE, ME, Acoustics, Industrial Design, and 20+ years of product development experience. I can work either as a Consultant or as a Staff Member with your dynamic, enthusiastic engineering group to solve complex problems with the initial PCB designs, production prototypes, DFM, DFT, DFR, QA returns, & product reliability. I also have special interests & expertise in Alternative Energy Systems.

## CORE SKILLS:

-Electro-Mechanical Design, Systems Integration, Schematics, Circuit Simulation, Printed Circuit Design & Prototyping

-Precision Sensors & Measurements, Analog & Mixed-Signal Circuitry, ADC/DAC, Data Acquisition & Data Logging

-Instrumentation, Embedded Microprocessors, ASIC & FPGA's, PLC's, Industrial Process Control Systems, & Test Fixtures

-CAD 2D, 3D, Schematic Design, SPICE, & PCB Layout of RF, Hi-Voltage, Hi-Current, SMPS, & DC-DC Converter Circuitry

-Grounding & Shielding, Signal Isolation Techniques, Opto-Electronics, IR, RF, V-to-F, Ultra-Sonics, Acoustics & Vibrations

-Servo Motor Controls, Linear, Stepper, BLDC Motor Drives, Battery Chargers, Co-Generation & Thermal Cooling Systems

-RF/EMI/ESD/EMC Test Set-Ups, Anechoic & Faraday Rooms, FCC Standards Compliance, and Environmental Stress Testing

-A wide range of Expertise in Engineering, a fast Learning Curve, Parallel Problem Solving, and Cross-Functional Skill Sets

-Excellent Communication and Technical Writing Skills.

## WORK HISTORY:

Product Development Consultant — Future-Spark R&D, Stockton, CA — Jan. '13 – Present

-Invented and engineered a powerful, long distance LF-EMP Shark Deterrent System on a PCB that fits inside a Surfboard.
-Named Fire-Bolt™, this Hi-Voltage Pulsed-Power System can also be used along shorelines and piers using solar power.

-Developed and refined a unique AC Electrolysis Process for extracting metals into a liquid solution. Some of these metallic solutions can be used as a topical antimicrobial and can be made with a countertop Micro-Station. This Hi-Voltage PCB has several safety features built-in for UL considerations, such as a bump/tilt shut-off switch and 2x the electrical isolation.

Engineering Consultant — Aurica Motors, LLC, Santa Clara, CA — Jan. '10 – Sept. '12

-Designed and engineered a long-range Electric Vehicle Chassis with Dynamic Steering and 4 independent wheel motors.
-Designed and developed the "Recursive" SMPS Electric Motor Drive utilizing my unique patent, USPTO No. 8,928,290.
-Designed and developed an onboard Re-Generative SMPS Battery Charging System, KERS, with >65% return energy.
-Investigated a variety of high capacity Battery-Swapping Platforms and various Drive-Thru Charging Stations.

Consulting Senior EE — B.A.E. Systems, Santa Clara, CA — April '07 – Oct. '09

-Implemented a new Fire Detection & Warning System into the MRLS Tank Chassis, a high Shock & Vibration Environment. This High-Reliability PCB board was built thoroughly to Military Specifications and included unique serpentine cut-outs around the two opposing mounting holes, thus making a mechanical PCB Suspension that isolated the heavy chassis vibrations from the soldered PCB components. -Studied the effects that RoHS & Tin Whiskers had on SMT Electronics.

R&D Consultant — Aurica Labs, Nice, CA — Jan. '02 - March '07

-Redesigned & redeveloped the infamous Beverage Electrostatic Speakers and High Voltage Tube Amplifier.
Utilizing my patented circuitry, USPTO No. 5103188, a new solid-state amplifier design was built onto a High Voltage PCB that drove the electrostatic film directly at bandwidths10x-20x faster than the original tube amplifier.
-Designed the PCB layout for Flash Recorder & Programmer. These two data-logging PCB's represented the first portable solid-state recorders, meant for transferring lectures onto CDROM's for author promotion & sales after each presentation.

Consulting Acoustics Engineer — Verticom, Santa Rosa, CA — May '01 - August '01

-Measured the PCB Resonance in the RF Module used in Point-to-Point Microwave Transceivers with a series of Acoustical & Mechanical Vibration Tests and applied several techniques from Dyad gaskets to air-form-foam on the PCB to reduce micro-phonic effects in the 6-12GHz YIG and Quartz Crystals, thus eliminating spurious harmonics in the carrier signal.

Hardware Engineer MyTurn/NewDeal, Inc., Alameda, CA Aug. 2K - April '01
-Re-engineered both the SMPS Power Supply and Modem Circuits on an embedded '486 Computer PCB. Using careful component selection, this cost reduction effort saved about 10% in space and component count on the motherboard. The new circuitry still met all International Safety & FCC Regulations while running compact & fast Geos-OS.

Consulting Systems Engineer Intevac, Santa Clara, CA Jan. '98 - March '99
-Engineered both the Timing Circuitry & PCB for a 12 Ch. Auto-Sequencing, Turbo-Pump Interlock System.
-Engineered a complete Wiring and Cable Harness that connected the main PLD Controller to all sensors, pumps, & actuators in a Glass Etch & CVD Process Machine used in making the first large Flat Panel Displays, 6x8 ft.

Contract PCB Design Engineer Golden Media, Marin, CA Sept. '96 - Nov. '97
-Generated the layout for a proprietary PCB used in Audio, Data, and Video Multiplexing Systems.
-Designed a 'folded-trace' pattern for multiple parallel data paths underneath each multiplexing chip by using a 2-port dual I/O IC that sent data in two directions and reduced the board space needed for data shifting in half.

Consulting Systems Engineer Lam Research, Inc., Fremont, CA June '95 - Aug. '96
-Designed, developed, and built the first Universal Safety Interlock PCB for Lam's four Semiconductor Process Machines. This 12"x14" 10-layer PCB board had full I/O opto-isolation for 56 signals, 4 ground planes, fused FPGA programmable logic, high voltage arc routing, ground-bounce sensing, and met full compliance with UL, IBM, FCC, CSA, VDE, TUV, S2-93, & CS International Safety Commissions.

Consulting Acoustic-Mechanical Engineer Toshiba, MRI Div., So. S.F., CA Jan. '94 - Nov. '94
-Developed an Acoustic Noise and Vibration Kit for use in Medical MRI Machines that cut internal noise by 27dB.
-Worked with Composite Structures for a Patient Bed & Track System that supported 300lbs on a 12ft span.

Consulting Design Engineer CADXCEL, Inc., Santa Clara, CA May '92 - Dec. '92
-Completed a full Product Development Cycle for a Silent Automobile Security System using a 300Mhz RF Remote Key Lock; from safety issues, to circuit design, through several prototypes, and the full PCB layout for both the Ignition Control Module and the RF key-chain remote.

Development Engineer Stellar Systems, Inc., Santa Clara, CA March '91 - May '92
-Re-engineered the RF PCB for an Outdoor Perimeter Security System that used 40Mhz in leaky buried coax cables, where any interference inside the High Voltage RF Radiation Pattern would detect an intruder's mass and velocity.

R&D Design Engineer, Contracting Pulse Sciences, Inc., Oakland, CA Jan. '90 - Oct. '90
-Designed Circuitry and the PCB Layout for 16 Ch. I/O control boards used for several Instrumentation & Control Consoles that required optical isolation from high system voltages.
-Developed and built a 6 Channel, Fiber Optic Isolated, DC Control System and an Opto-Isolated DC Servo Loop, both with 0.01% linearity for controlling the HV Extraction Power Supplies in the first 1.1MeV High Energy Ion Implanter.
-Troubleshot and repaired PCB's in Custom High Voltage Switching Power Supplies >100kV for Pulsed Power Equipment built for the SDI, Nuclear, & Particle Acceleration Research Programs.

## EDUCATION:

Northeastern University, Boston, MA
Colorado State University, Fort Collins, CO

## RELATED EXPERIENCE:

-Received Patent No. 8,928,290 in 2015 for a unique SMPS Motor Drive Technology that cuts the power drain from a battery in half, thus doubling the practical driving range for Electric Vehicles.

-Received Patent No. 5,103,188 in1992 for Current Feedback Amplifiers that significantly increased speed and stability in solid-state amplifiers. These three analog blocks are now ubiquitous in Audio IC's, HD Video, ADC's, DAC's, Precision PLL's, ADSL Line Drivers, Cellular Phones, and Sat-Comm.

-Invented, designed, and built the HV electronic instrumentation for the world's first Dual-Use Langmuir Plasma Probe.