Charles Sampson

Independent Contractor - Up-Rev Inc
Melbourne, FL
-Email me on Indeed: http://www.indeed.com/r/Charles-Sampson/ed6c8e09ef735062

Seeking a position where I can use my years of experience in analog and power supply design to develop new products.

Authorized to work in the US for any employer

Work Experience

Lead Engineer Power Supply Design

Harris Corporation GCSD - Palm Bay, FL
August 2018 to Present

Lead Power Supply Design Engineer for five programs over the past three years. All power supplies designed have passed electrical stressed screening tests and all meet their specified performance.

Designed a 60 A, 0.85 V multiphase (dual phase) synchronous buck converter for the F35_TR3 program. Converter powered a 9p FPGA. Programmed the converter, TPS63569, using Code Composer Studio. The design featured advanced voltage positioning, Reduced the number of output capacitors by 50% using this technique. Coded the compensation, load shedding and interleaving capabilities, Ported code to NVM using the Pm Bus.

Design was successfully tested and passed the rigorous safety of flight testing.

Developed C program for optimizing buck converter design using Genetic algorithms.

Independent Contractor

Up-Rev Inc
November 2017 to Present

Designed 150 W EMI filter, inrush circuit, lightning protection, short circuit protection and over/under voltage protection for DO160G compliance. Designed several low power DC-DC converters, to include magnetics, capacitor banks, and control circuit.

Electrical Engineering Manager

CCI Power Supplies, LLC - Longwood, FL
February 2017 to November 2017

Longwood FL
Designed and tested a 2.5 kW LED power supply. The new design consists of two interleaved, full-bridge ZVT converters synchronized in parallel.
Electrical Engineering Manager

Magnetic Designer

Mainstream Engineering Corporation
March 2010 to February 2017

Designed the dual-active-bridge (DAB) converter for the S4R04 Nasa Spacecraft Power System. Designed and simulated the three-phase transformer in Magnetic Designer. Implemented a SPICE simulation to verify transformer and DAB converter performance.
Designed, built, and tested a low voltage, three-phase, permanent magnet, compressor motor controller. Characterized the motor parameters and developed a high fidelity Matlab motor model. Wrote C code for the TMS320F28069 microcontroller using Code Composer Studio. Designed the power electronics for the motor inverter and achieved 96% peak efficiency. Verified the inverter electronics design using SPICE. Designed the input and output filters, PCB layout, current sense circuitry, voltage sense circuitry, OVP, and OCP circuits. Developed a thermal model of the inverter PCB in Matlab to ensure optimum efficiency over load and speed range. The compressor motor is part of the Personnel Portable Man Cooler program.
Designed a 30kW, 208VAC, three-phase inverter- design met MIL STD 1332B standards and obtained a 20W/in^3 power density. The inverter architecture was based on a 5kW DC-DC converter cascaded with a 5kW inverter. Developed the inverter controls based on FOC to achieve 99% power factor and 92% peak inverter efficiency. The 5kW units achieved 90% overall efficiency. The unit provided 20 kW surge power out to 65 degrees C ambient.
Wrote winning proposal for a tactical shelter power system design. Invented new method for balancing loads on a micro-grid. Designed 1.5 kW grid connected inverters and controls for distributing power between phases and maintaining equal load sharing.
Re-designed an HVAC relay control system to improve system manufacturability and reduce cost. Designed new board using Altium layout software -built footprints for new part and developed 3D models for mechanical designers. Designed noise mitigating circuits for Mil Standard 461F, RE102, CE102, and CS101 requirements.
Wrote technical portion of winning proposal for the Army Ignition System Program. Invented a variable energy ignition system for heavy fuel engines. Tested and verified the new ignition system energy variation from 50 millijoules to 250 millijoules.
Wrote the technical portion of the winning proposal for the Advanced Battery Charger Program. The user selectable, 1kW and 300 W power limit, design for the US Marine Corp, consisted of an AC DC power factor corrected front end, an LLC, LCC resonant mode DC DC converter, and a synchronous buck converter. Design met the stringent MIL STD 461 RE102 requirements. Overall efficiency of the charger was greater than 85% efficient over a 10% to 100% load range. Designed, built, and tested the PCB, boost inductors, and isolation transformer. The charging circuit was controlled by MSP430F5510 8 bit microcontroller that set the various charging currents and float charge references via a PWM signal. Developed the algorithm and C code for the Li-Ion and NiCAD charging routine. Developed a new remote sense network for the Li-ion charging circuit that prevented high leakage and battery self-discharge currents when battery was left in charger.

Senior Hardware Engineer

Petra Solar Inc - Orlando, FL
June 2009 to March 2010

Optimized BCM Flyback inverter Achieved greater than 94 percent efficiency at 100 W output. Designed grid-tie circuitry, voltage and current sensing circuits, high efficiency housekeeping power supplies Designed transformer and EMI filter.

Principal Engineer

Rockwell Collins Inc - Melbourne, FL
June 2008 to June 2009

Designed 800W peak, 400W average tracking DC DC converter for HF Power Amplifier. Designed control loop for 60 Hz bandwidth and 60 degrees phase margin. Unit tracked an audio signal (300 to 3KHz at

<3% THD) and provided an audio modulated bias voltage to an HF power amplifier for improved PA system efficiency. Design based on a Full Bridge ZVT operating from 200V input. Output capable of varying from 10V to 50V at a 3KHz rate. Peak power efficiency achieved: 92 percent at 650Ws. 60W/in^3 power density operating at 500KHz. Designed and/or specified all magnetics, output inductor and planar transformer version.
Modified design of a 700W single phase variable input frequency PFC to meet DO160F and ABD1000 requirements. Frequency varied from 400 to 800 Hz. Modified control loop to improve regulation and reduce second harmonic distortion. Modified EMI filter with optimum damping network to improve harmonic distortion. Design met ABD100 and RTCA DO160 power requirements. Corrected tolerance issues with overvoltage, under voltage lockout circuits to make unit manufacturable.
Created SPICE and SABER model of PFC and Tracking DC DC Converter. PFC Model was a deliverable item shipped to the customer and included waveform verification.

Engineer IV

Harris Corporation - Palm Bay, FL
February 2003 to June 2008

Designed 250W, five output, RCD Clamp forward converter. Design met 704 E and F and Lockheed EPS specification. Design featured high frequency, high power density, remote sense and independent short circuit protections on all outputs. Designed patentable remote sense circuit which allowed the converter to regulate at 20 feet from its load. Power supply could handle 50 A/us step load transients from 20 feet away. Designed earned the company's Next Level Award and is currently in production phase. Designed HV Cuk and various synchronized DC DC converters. All designs were simulated in time and frequency domain using SPICE. Presented focus groups and white papers covering topics on optimizing transformer design, Cuk Converter control loop design, Synchronous Rectified Flyback Design, and Low Noise, Linear Regulator Design.

Education

Master's Degree in Electrical Engineering

Cal State Univ of Northridge - Northridge, CA
June 1999

Bachelor's Degree in Electrical Engineering

University of Maryland, College Park - College Park, MD
June 1988

Skills

- Analyzer (Less than 1 year)
- Cadence (Less than 1 year)
- Excel (Less than 1 year)
- MathCad (Less than 1 year)
- SPICE (10+ years)
- Electrical Engineering
- AutoCAD
- MATLAB

Military Service

Branch: United States Army
Rank: E5

Additional Information

Skills
Skill Name Skill Level Last Used/Experience
Excel Intermediate Currently used/10
MathCad Expert Currently used/15
Cadence/OrCAD Intermediate Currently used/5
Oscilloscope Expert Currently used/20
PCAD Intermediate Currently used/5
Spectrum Analyzer Expert Currently used/20
SPICE Expert Currently used/20
Impedance Analyzer Expert Currently used/20