

## Ronald Selman

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**Objective:** Electrical Engineering

**Summary:** Over 12.5 years experience designing world class electronics. Has rigorous technical expertise in digital, analog, and programming disciplines with many significant contributions to new product releases, from inception of design concept through pilot manufacturing runs. High volume productivity in assignments and maintains intensive attention to detail thus resulting in a high reliability product. Generates, elicits, and maintains a productive work environment.

### **Skills and Accomplishments:**

Planned high magnetic field version of in-line Quasi Static tester will need linearization circuit to servo magnetic field strength to command voltage. I proposed and developed a Hall Effect sensor driven correction circuit subtracting the command voltage from the measured field strength. This high gain circuit would correct nonlinearities in magnetic field strength better than 1% across +/- 1.8T. Utilizing a precision Instrument Amp, difference OpAmp circuit, and adjustable Current Source it was very stable and had substantial bandwidth. For potential error conditions a guard band circuit monitored the output signal. I am listed as a co-inventor on submitted patent application "Closed Loop Magnet Control" with company founders as 1<sup>st</sup> and 2<sup>nd</sup> inventors etc.

Hard Disk Drives are being designed in by automobile manufactures and into personal consumer electronics; this requiring operation in far colder environments. Recommend use of Peltier device in lieu of cartridge heater to facilitating Cold and Hot option for bench top model Quasi Static tool. The existing OEM temperature/power controller is very expensive and hot side control only. Utilize cheaper and more appropriate OEM hot/cold temperature controller with existing but slightly modified bi-polar 500W linear magnet power supply subsystem. Inasmuch the noise measurement threshold of a Quasi Static tool is 10 micro volts; the hot/cold temperature controller's internal switching power supply was by-passed. Additionally the temp controller's outputs needed to be buffered to drive the bi-polar magnet power supply input and I designed a small board to do this. The temp controller fit inside the bi-polar magnet power supply subsystem chassis on the front panel. This all worked very well and was quickly released to manufacturing with complete documentation package. Presently it is in use on a new 12 channel Quasi Static temperature stress tool utilizing multi Peltier devices.

Design ~100 printed circuit board layouts of high performance Hard Disk Read/Write Head probe cards for high bandwidth Quasi-Static test instrument. Controlled impedance trace layout (to 1.2GHz) for signal analysis of +10 micro-volt level noise generated by R/W heads under magnetic field. Rigid dimensional criteria with numerous placement restrictions and exact polygon copper shapes. Connectivity varies between vendor Read/Write head preamplifiers requiring complex datasheets to determine characteristic impedances, signal descriptions, PECL levels etc. As principle or collaborator I performed many more PCB layouts of small and mid size analog, digital, and mixed signal boards.

Sustaining with extensive schematic and test procedure improvements, layout changes, and BOM upgrades for 4 axis low noise Analog Step Motor controller, Bi-polar 500W electromagnet linear power supply, ultra low noise / high speed DAQ sub-system, and high speed USB2.0 isolated communications PCBA set. Was a major contributor to transfer of large in-line mechatronic assembly to offshore turn-key manufacturer. Active in supporting manufacturing test on production problem PCBA's and Field Returns.

Assigned Engineering Project Lead of Beta level Stylus-NanoProfilometer (SNP) Hardware Development. This in-line metrology tool characterized Z defects in Phase Shift Photomasks and needed to be finished for customer acceptance testing in short time frame. Finished designs of electronic motion control, and electro-mechanical sub-systems; additionally cable assemblies, Mains power distribution, UPS power distribution, chassis parts, cameras, microscopes, and was principle for CE Mark compliance. Shipped Beta unit on schedule, passed on-site acceptance testing and received prompt payment. For this product version was also co-developer of the 5 axis motion control using 3 phase servo motors, servo amplifiers, micro stepper motors, Galil Motion controller, and Intelligent Motion step motor controllers. Was co-developer of Auxiliary Control 24 I/O subsystem having numerous isolated outputs like open collector transistor, MOSFET, relay, and TTL. Advise, critique, and debug mechanical design issues for tool enclosure skins, vibration/sound insulation, material handling access doors, cable holder brackets, 19" equipment racks/enclosures, granite block support table, safety signal light towers, and etc. Generate nameplates and subsystem identification labels with laser printer and laminate with clear plastic labels and/or clear spray paint. Front panel and chassis parts silkscreen photomask generation with PCB layout programs.

Principle designer of 3 angstrom resolution Capacitive Distance Measurement PCBA used in new version SNP achieving 30<sub>ppm</sub> accuracy. Utilized OpAmp in transconductance mode having a "T" feedback circuit, lock in amplifier/detector, AC integrator, 13<sup>th</sup> order filter sinewave generator, precision DAC, and voltage reference. Built pilot production run then released and shipped to customer base.

DAQ PCBA is not performing to 16 bit accuracy even with large sample size averaging. I designed higher performance replacement with 3X speed increase and 16 bit accuracy with small sample size. This PCB layout had critical ground plane and component placement requirements.

Auger Electron Spectroscopy Thin Film Analysis product will not function on attempted release; assumed debug and final design changes on electronic subsystems. Built and documented robust electronics surpassing original performance specification with isolated HV power supplies, zener/resistor attenuation ladders, and isolated closed loop linearization control circuits.

Industrial Fluoroptic Thermometry product for HV power transmission transformers is not being manufactured reliably. Design, construct, and write software for comprehensive test fixture allowing complete test of instrument. Eliminated 100% of test operator errors and provided significant debug and validation tools. This greatly speeded up the test process for fully functional systems.

Non-contact wire extrusion thermometry instrument does not meet CE Mark requirements. Redesign the electronics and sensing head resulting in enhanced performance. I made significant improvements to the Users Manual and associated documentation. Passed CE Mark and increased European orders.

Principle or collaborator on numerous SEMI Safety certifications: S2-0302, S2-0300, SOP39, and 3<sup>rd</sup> party CE Mark. Designs compliant hardware and documentation concurrently with project development.

Design and build electrical wiring harness for MECA Sample Wheel / Translation Stage on Phoenix 2007 Mars Lander. Test reliability with extensive motion control script using OEM step motor controller.

### **Employment History:**

Electronics Engineer, Integral Solutions Int'l, Santa Clara, CA	3 years
Electrical Design Engineer, FEI Company (Acquired Surface Interface, Inc.), Sunnyvale, CA	5 years
Sustaining Engineer, LUXTRON CORP. (DBA: Lumasense Technology), Santa Clara, CA	7 years

### **Education:**

Computer Programming from DeAnza College: PSpice V9.2, VBasic, UNIX, OOP, C++, C, Scientific Pascal, and MASM with SJSU Programming, Math, and Physics transfer requirements completed. Associate in Arts from Cabrillo College.