

Craig Patton  
940 Morgan Drive  
Boulder, Colorado 80303  
Craig@RedgardenEngineering.com  
720.281.5541

**Education:**

Bachelor of Science degree in Electrical Engineering from the University of Wyoming. Graduated in May of 1981. Member of Tau Beta Pi engineering honorary.

**Capabilities:**

*Analog and Digital Hardware Design:*

Analog capabilities include designing with op amps, comparators, discrete transistors, analog switches, voltage regulators, D to A converters, A to D converters, Infrared detectors, and sample and holds.

Microprocessor design capabilities include design with CPUs, RAM, ROM, Flash, memory decoding, counter/timers, FIFOs, dual ported memory, bus isolators, real time clocks, serial and parallel I/O devices, low power battery operated embedded systems, digital signal processors, programmable gate array logic, and various logic families.

*Algorithm Development:*

Algorithm design and software/firmware implementation experience includes algorithms for pressure, temperature, and IR detector pedestal offset subtraction for use in an IR spectrophotometer; signal processing and signature analysis algorithms including digital filtering techniques and Fast Fourier Transforms for use in a heart rhythm analyzer; routines for determining invasive pressure systolic, diastolic, and mean values, invasive temperature, heart rate, and impedance pneumography derived respiration rate for a physiological monitor.

*Optical Design:*

Optical design capabilities include spherical and flat mirrors, linear variable filters, discrete frequency optical filters, quantum and pyroelectric detectors, and choppers.

*Mechanical Fabrication:*

Mechanical capabilities include part fabrication using lathes, milling machines, and CNC millings machines; tubing bending, welding aluminum and stainless steel.

*General Design and Test Practices:*

General practices include validation testing (to customer requirements) and verification testing (functionality), design for manufacturability, design for test, system level design architecture, task and module partitioning, product specifications, engineering specifications, test documents, and failure modes and effects analysis.

## **Work History:**

### 2009-2010

Independent Contract Engineer: Completed various electronic hardware and software designs including as a Redgarden Engineering affiliate engineer.

### 2002 to 2009

Hardware Firmware Engineer  
Inovonics  
Louisville, Colorado

Developed RF products for use in wireless security systems, wireless remote sensing, and process control. Responsibilities included analog, digital, and embedded system design in battery powered transmitters and receivers. Worked closely with marketing defining and implementing new products. Until recently, Inovonics built their circuit boards and products in house, so as a designer I worked very closely with manufacturing, test, purchasing to maximize profitability.

### 2000 to 2002

Independent Contract Engineer  
Optiscan  
Alameda, California

Contributed on the system design, electrical design, and resource management on their proof of concept, non-invasive blood glucose monitor. Responsibilities included, analog and digital design of a low noise, high resolution (14 simultaneously sampled 20 bit A/D channels) digital signal processor based system used to monitor and control their experimental systems for laboratory and human testing.

Independent Contract Engineer  
Dolphin Medical  
Hawthorne, California

Contributed as a member of a team of engineers spread across the U.S. in the design of an oximeter for use in veterinary medicine. The design intent was to have the hardware meet the marketing and regulatory requirements for both the veterinary and human monitoring markets. Responsibilities included cost sensitive electrical design, documentation, managing parts procurement, and scheduling subcontractors for assembly.

### 1997 to 2000

Independent Contract Engineer  
BI Incorporated  
Boulder, Colorado

Served as the lead electrical engineer on the design team of an in home sobriety tester. Responsibilities included fuel cell testing and algorithm development, embedded systems design, signal conditioning design, prototyping, and interfacing with vendors and manufacturing.

Also led the electrical design effort of BI's next generation home arrest receiver. Responsibilities included embedded systems design, signal conditioning, prototyping, range testing, antenna pattern testing, interfacing with the RF contract engineer, software engineers, and manufacturing.

Independent Contract Engineer  
Square One Technology  
Boulder, Colorado

Worked to improve the performance of a solid state laser based gas spectrophotometer.

#### 1989 to 1997

Staff Engineer I  
Ohmeda Monitoring Systems  
Louisville, Colorado

Worked with a team that developed an infrared spectrophotometer for measuring anesthetic agent concentration. Worked with vendors specifying custom IR detector parts that included a 74 element, room temperature, pyroelectric detector array, a linear variable filter, an ASIC which provided signal conditioning, and a ceramic package with a filter well and window to house it all. Responsibilities included concept feasibility studies, modeling, prototyping, specification of parts, hardware and software design, vendor interface, and protecting Ohmeda's patent position on the IP.

Designed patient connected electronics and algorithms for use in a vital signs monitor which measured invasive pressure, ECG, respiration, non-invasive blood pressure, oxygen saturation, and temperature. Participated in the clinical trials of the device in both operating rooms and critical care units.

#### 1984 to 1989

Senior Product Design and Development Engineer  
SpaceLabs, Inc.  
Redmond, Washington

Responsibilities spanned the total development cycle, including interfacing with marketing, product specification, hardware and software design, prototyping, debugging, supporting manufacturing, clinical trials, and interfacing with patent attorneys. Work involved hardware and algorithm design for the 90103 Holter Analysis Workstation and the 90600 series of patient monitors.

#### 1981 to 1984

Hardware Design Engineer  
Boeing Aerospace Company  
Kent, Washington

Worked on space flight avionics for the Inertial Upper Stage. Responsibilities included hardware design, interfacing and coordinating with the U.S. Air Force and NASA, supporting qualification and acceptance testing, isolating test failures to the part level, defining rework, and determining the retest requirements. Obtained a secret security clearance.

#### **Hobbies and Interests:**

Photography, bicycling, music, sailing, tennis, skiing, scuba diving, boat building, dancing, and Amateur Radio (Extra Class license, NS7S).