

# Zachary W. Walden

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—Seeking a challenging position designing and testing software and hardware for mixed-signal embedded systems in a team environment with growth and leadership potential. Utilizing my skills, knowledge and experience to provide excellence in product development and manufacturing. Contributing quickly to the success of projects that will improve and expand the product lines at Enduro Pipeline Services.

## Skills

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### –Hardware

**Design** – Kicad (Schematic Capture, PCB layout), Cadence Design Entry CIS, Digital (Microcontrollers, FPGA, 74 series), Analog (Op-Amps, Transistors, Diodes)

**Verification/Validation** – Cadence PSpice, Oscilloscopes, Function Generators, Multimeters, Logic Analyzers, Network Analyzers

**Prototyping** – Breadboard, Iron & Hot Air, SMT (Experience with all package types except BGA, QFN, & Wafer Scale), THT

### –Software

**Languages** – C/C++ (Embedded(RTOS, PIC, STM32, AVR), Linux, Windows), Python, Assembly (AVR), Verilog (CocoTb), MATLAB/Simulink, Java (General, Android), Bash

**Other** – Docker, GDB, Git, Qt GUI (Python & C++), General Linux, UML, SYSML, L<sup>A</sup>T<sub>E</sub>X, Agile

## Education

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### –Oklahoma Christian University

*Bachelor of Science, Computer Engineering, GPA 4.0/4.0, Summa Cum Laude*

*Aug. 2018 - Apr. 2022*

## Honors & Awards

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### –Oklahoma Christian University

- Outstanding ECE Senior 2022
- Outstanding ECE Junior 2021
- Outstanding ECE Sophomore 2020
- The President's Scholarship 2018 - 2022

## Experience

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### –Oklahoma Christian University

#### Professor's Assistant –

*Dec. 2020 - Jul. 2021*

- Designed 2 revisions of a 3-channel adjustable full color laser diode driver board, using Kicad, to replace a 7-color driver board using an enhanced differential Howland Current Pump
- Selected components to meet the frequency needs in excess of 12 MHz
- Designed, laid out and routed a 9V 3A buck converter
- Reverse engineered 7-color TTL driver board using a multimeter in continuity mode

#### Teaching Assistant: CENG-3203, CENG-3213, ENGR-1122 –

*Jan. 2020 - Mar. 2020, Aug. 2021 - Apr. 2022*

- Helped students troubleshoot hardware and software issues with 8-bit AVR Microcontrollers, 74 series logic, HD44780 LCD's, Keypad encoders and parallel DACs in order to control a laser scanner system
- Instructed students on Assembly language concepts
- Guided students in constructing an autonomous robot
- Assisted students in debugging Analog & Digital circuitry, along with embedded C written for Microchip's 16-bit dsPIC line

### –VisuALS Technology Solutions, LLC

#### Java Programmer –

*May 2019 - Aug. 2020*

- Designed a Spring REST API to authenticate a software purchase using a tablet's IMEI number
- Connected the authentication API to a SQL database that stored the hash of the IMEI
- Designed a SQL database running on Google's Cloud
- Wrote dynamic Android U.I. elements
- Researched Machine Learning for text prediction (Tensorflow, Tensorflow Lite)

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## Projects

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### –8-bit 5-stage Pipeline RISC CPU [View on GitHub](#)

*Jan. 2022 - Apr. 2022*

- Designed and implemented 32-bit fixed-length RISC instruction set comprising 42 instructions
- Architected and implemented, from scratch, an 8-bit mostly bypassed CPU with a 5-stage integer pipeline in Verilog and ran it on a Xilinx Spartan 7 board
- Implemented and integrated a vga sync generator and a dumb framebuffer into the cpu using special instructions to write to the framebuffer
- Wrote a simple assembler for the instruction set in Python along with helper scripts to convert the assembler output into Xilinx's coe format
- Debugged modules using test benches written using the Cocotb framework for Python and viewing waveform dumps in GTKWave
- Used Xilinx's Integrated Logic Analyzer IP in conjunction with an internal reset trigger circuit to troubleshoot on chip behavior

### –DC/DC Boost Converter

*Sep. 2020 - Nov. 2020*

- Designed a discrete boost converter taking a 6V input and giving an adjustable 12V-24V output in steps of 0.1V using a PIC microcontroller for control
- Achieved an average of .54% error relative to the target output voltage
- Used PIC Datasheet and Family Reference Manual to write register level PWM and SPI drivers
- Wrote simple proportional-only control system to stabilize the output voltage, along with a bias adjustment to ensure the correct setpoint was reached
- Designed and assembled a printed circuit board for the project
- Led a 3-person team, delegating responsibilities to members

## References

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### –Jeff Bigelow, Ph.D.

- Chair, Department of Electrical & Computer Engineering, Oklahoma Christian University
- Email: [jeff.bigelow@oc.edu](mailto:jeff.bigelow@oc.edu)
- Office Phone: (405)-425-5448
- Professor and supervisor for my teaching assistant positions

### –Steven P. Maher, M.Sc.

- Associate Professor, Department of Electrical & Computer Engineering, Oklahoma Christian University
- CEO, VisuALS Technology Solutions, LLC
- Email: [steve.maher@oc.edu](mailto:steve.maher@oc.edu)
- Office Phone: (405)-425-5407
- Professor and employer at VisuALS Technology Solutions, LLC