Juan Aguilar

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EDUCATION

University of Houston, Cullen College of Engineering Houston, TX
Bachelor of Science in Computer Engineering - 3.25 GPA *Expected Graduation: May 2026*

- Coursework: Data Structures, Computer Architecture, Digital Logic Design, Microprocessors, Automatic Control Systems

PROJECTS

32-Bit RISC Processor

- Designed a 32-bit ARM-like CPU that handles data processing, memory operation, and 15 branching mnemonics.
- Implemented RISC-based microarchitecture, memory management, and instruction decoding.
- Utilized Verilog to synthesize the CPU into 4 sections: Controller, Datapath, Data Memory, and Instruction Memory, using EDA Playground (Icarus 12.0).
- Used test benches to verify 23 operations (ADD, SUB, ORR, Branching, LDR, STR, and conditional operations).

Function Generator

- Designed a function generator using three 741 operational amplifiers, potentiometers, resistors, and capacitors.
- Managed component placement and signal integrity, verifying designs using LTSpice, oscilloscopes, and multimeters, which resulted in a functional prototype (breadboard).
- Final product delivered a 20-volt peak-to-peak output, with a maximum DC offset of 5 volts, and a maximum frequency of 50 kHz across Square, Triangle, and Sinusoidal waveforms.

Car Alarm System

- Developed a 2-button input system using GPIO switches for real-time door state detection.
- Applied bit masking on a TIVA-C microcontroller for efficient 32-bit GPIO control.
- Implemented a software delay routine of 500 milliseconds for smooth LED transitions.

Traffic Light Controller

- Used TTL chips to create a 4-way traffic light controller consisting of 5 d flip-flops, 24 two-input AND gates, and 9 OR gates.
- Designed a controller counter mapped from 10 k-maps into optimized Boolean expressions.
- Verified the controller using simulation tools mapped from 0 nanoseconds to 1000 nanoseconds.

WORK EXPERIENCE

QuikTrip Cleveland, TX
Clerk *Feb 2022 – August 2024*

- Diagnosed and maintained electrical and mechanical systems, ensuring consistent operational performance
- Developed structured training programs, improving team productivity by 40%.
- Actively worked with management to deliver a satisfactory rating of 98% across all sections of the establishment.
- Utilized technical skills to streamline daily operations by optimizing equipment workflows and ensuring compliance with safety and quality standards in various areas.

SKILLS

Circuit/Hardware Physical Design:

- VLSI Design (RTL Design/Verification), CPU Design, PCB Design, CMOS Logic, Digital Logic, MOSFETs, BJTs

Programming Languages:

- C/C++, Verilog/SystemVerilog, ARM Assembly, Python Scripting

Software/Tools:

- Altium Designer, MATLAB, LT Spice, Autodesk CAD, Linux, Git