

Shubham Anand

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Professional Summary

A highly skilled embedded systems engineer with extensive experience in C programming, hardware debugging, and system optimization. Proficient in developing test scripts and automation solutions to streamline testing and enhance system performance. Experienced in writing and executing test scripts for RAM read/write operations, regression testing, and validating communication protocols such as CAN, KWP, and Ethernet loopback. Adept at using tools like Eclipse, JTAG, and Lauterbach for debugging and optimizing embedded systems, with a focus on reducing execution times and improving system efficiency. Additionally, proficient in working with AI-enabled fintech cloud applications, data analysis, and integration. Well-versed in version control using GIT and Linux-based file systems. Known for delivering reliable, high-quality solutions and ensuring robust system integrity while reducing manual testing efforts through automation. solutions.

Education

SKP VIDHYA VIHAR, PCM June 2019

- Percentage%: 79.4

SRMIST, Btech in ECE May 2019- June 2023

- CGPA: 9.1/10.0

Experience

Embedded Software Developer, Bosch Global Software Technologies, Coimbatore Jan 2023 - Present

- Embedded Systems Engineer with hands-on experience in firmware development, hardware debugging, and software optimization for embedded platforms
- Skilled in C programming, memory operations, and protocol-based communication for embedded applications
- Performed an analysis on configuring a pin for an EV charger, assessing electrical requirements and optimizing pin assignments for efficient charging functionality.

Full Stack Web Development - Internship, HighRadius Jan 2022 -Apr 2022

- Worked with datasets to train ML model for an AI-enabled fintech B2B cloud application.
- Collaborated with teams to integrate AI models into the cloud-based platform, optimizing performance and scalability.

Projects

Implementation of Multi-Register Read Function for USS ASIC Communication

- Developed a function for efficient **multi-register reads from a USS ASIC** using a structured request-response format.
- Optimized data extraction with bit-wise operations and memory management.
- Added error handling for invalid addresses and sizes, improving stability.
- Designed for modularity and maintainability following embedded C best practices.
- **Reduced execution time by 15%** over the single-register read approach.

Read and Write operation on RAM for Zynq Ultrascale

- Developed **C-based service routines** for writing and reading specific parts of RAM on the *Zynq UltraScale (ZU)* processor, ensuring efficient memory operations.
- Utilized **VS Code** for coding and **Eclipse** for debugging.
- Conducted hardware debugging using **JTAG** and **Lauterbach** to verify data integrity.
- Performed **unit and regression testing** using pseudo address regions, as actual addresses were sourced from the ECU.

- Executed and **flashed the code** onto the ZU processor for seamless functionality.
- Optimized **Python scripts**, significantly reducing integration time.

Ethernet Loopback Test between Microprocessor and PHY

- Implemented an **Ethernet loopback test** between the *Zynq UltraScale+ (ZU)* as the **MAC** and **RTL9000** as the **PHY**.
- Configured both **MAC and PHY interfaces** to ensure seamless data transmission and reception.
- Validated **loopback functionality** through signal monitoring and protocol verification.
- Performed **debugging and troubleshooting** to ensure error-free operation and correct data flow.
- Used **hardware debugging tools** like *JTAG* and *Lauterbach* for in-depth analysis and validation.

Hardware Variant Creation, Deserializer Adaptation and ISP Integration:

- Led the creation of a new **NRCS2 ECU hardware variant** based on the **BYD architecture**, modifying hardware identification and configuration to support multiple camera setups.
- Adapted the **video processing pipeline** by replacing the deserializer with **TI**, ensuring seamless **MIPI CSI-2** communication with the *Zynq UltraScale+ SoC*.
- Updated **firmware and test routines** to support the new deserializer, configuring **MIPI PHY and clock settings** for stable video streaming.
- Integrated an additional **ISP** for enhanced image processing, modifying data routing and validating video integrity across multiple camera inputs.
- Conducted extensive **debugging using JTAG and Lauterbach**, ensuring proper initialization and system stability.
- Performed **end-to-end validation** from **ECU to instrument panel display**, ensuring seamless video output.
- Collaborated with **cross-functional teams** to document initialization sequences, optimizing **system performance** and future troubleshooting.

Switch Box

- Designed and built a **switch box** with three positions: **Off, CFI mode, and Manual On**.
- Integrated a **relay and transformer** to control the switching mechanism.
- Configured the **relay** to enable seamless switching between modes.
- Utilized the **transformer** for power regulation, ensuring each mode functions correctly.

Technical Documentation

- Created **in-depth technical documentation** for service routines, detailing functionality, implementation, and debugging procedures.
- Provided clear **guidelines for future development and troubleshooting**, improving maintainability

Technologies

Languages: Embedded C, C, Python

Technical Skills: CAN, I2C, SPI, JTAG, Ethernet, Lauterbach, Unit and Regression Test, VS Code, Git, Linux, Excel, Powerpoint

Skills: C, Embedded C, RTOS, Python Scripts, Manual Testing, Selenium, Automotive, ADAS, ECU, SDLC, Unit Test, Regression Test, Test Automation, Data sheet Analysis, GIT, DOORS, JIRA

Soft Skills: Problem Solving, Attention to detail, Communication skills, Time management, Continuous learning