

Venkata Sai

Embedded Software Engineer | Linux Device Drivers | Embedded Systems | AUTOSAR

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Bangalore, Karnataka, India

Professional Summary

Embedded Software Engineer with 2.8 years of experience in **automotive ECU software development** including **Bootloader development, AUTOSAR integration, Linux driver development, and RTOS-based systems**. Strong expertise in **CAN, I2C, SPI, UART Communication Protocols**, firmware flashing, **low-level hardware interfacing**, and real-time system design. Experienced in **diagnostic protocols (UDS)**, embedded cybersecurity concepts, and debugging complex embedded systems.

Key Skills

- **Programming Languages:** C, C++, Embedded C/C++, Python.
- **Protocols:** UART, I2C, SPI, CAN, CANFD.
- **Modules/Drivers:** PORT, GPIO, DIO, ADC, MCU, I2C, SPI, WDG, FLS, PWM, ICU.
- **Microcontrollers/SoC:** Infineon TC39x, TI J721E, TI AM62X/AX, LPC4337, STM32F407, LPC2148, C8051F120.
- **Tools/IDEs:** Tasking, Lauterbach Trace32, Code Composer Studio 12, Cross Core Embedded Studio, VSC, Keil, Silicon Labs, EBTressos, Davinci Configurator / Developer, Putty.
- **Embedded Linux:** Device Drivers (SPI, I2C, UART), Device Tree (DTS), Kernel Modules, BSP
- **Development Methodologies:** ASPICE-compliant V-model process, Agile methodology (Scrum).
- **Standards:** ISO 26262 (ASIL-B/D), DO-178B, MISRA C and Functional safety.
- **Operating Systems:** Windows, Linux, RTOS.

Professional Experience

1. Embedded Software Engineer | Tata Elxsi | Aug 2025 – Feb 2026

Project: AUTOSAR HWIO Integration & Validation

- Performed **system-level analysis and debugging of automotive body control functions** (Ambient Lighting, Vented Seats, Fog Lights) to resolve customer-reported ECU software issues.
- Analyzed **ASPICE SYS.1, SYS.2, SYS.4 and SWE.1, SWE.2 requirements** using IBM DOORS DNG and validated software architecture models in IBM Rhapsody, ensuring **traceability between requirements, design, and testing artifacts**.
- Configured **AUTOSAR MCAL drivers (DIO, ADC, PWM)** for hardware I/O signals and defined **system variables in Vector DaVinci Configurator** to support SIL testing, manual validation, and automation workflows.
- Developed and executed **AUTOSAR integration and SIL test cases** to validate communication and signal flow between **SWC, RTE, IOHWAB, and MCAL layers** for sensor and actuator components.
- Performed **real-time integration testing and signal validation using TRACE32 debugger**, monitoring I/O behavior and identifying hardware-software interaction issues.
- Designed and implemented a **Python-based test automation framework**, reducing manual testing effort and enabling **CI/CD-based automated regression testing for AUTOSAR integration**.
- Collaborated with cross-functional teams to **analyze ECU signal flow and resolve AUTOSAR configuration issues during system integration**.

Tools: DaVinci Configurator, IBM DOORS DNG, IBM Rhapsody, TRACE32, CI/CD, AUTOSAR Classic, MCAL (DIO, ADC, PWM), IOHWAB, SIL, Embedded C, Python.

2. Software Engineer | KPIT Technologies | Pune | July 2024 – June 2025

Project: TATA MDGB and IFX Controllers

- Configured **CAN Stack** from **COM Module to CAN Driver**, implementing **messages, frames, signals, and PDUs**, and modifying signal functionalities using **Embedded C** for **customer-specific (ComVeh) requirements**.
- Worked with DCM module for Development of **CAN Bootloader** using UDS protocol 0x10, 0x11, 0x22, 0x2E, 0x27, 0x3E, 0x34, 0x36, 0x37, 0x31 and 0x19.
- Configured and validated **AUTOSAR MCAL** drivers including CAN, MCU, PORT, and DIO, ensuring correct initialization sequence and ECU startup behavior.
- Performed **low-level debugging of CAN interrupts and peripheral registers using TRACE32**, identifying timing and synchronization issues.
- Performed **system-level debugging across AUTOSAR layers (SWC → RTE → BSW → MCAL)** to trace signal flow issues and validate ECU communication behavior.
- Developed and executed test cases and test scripts for integration testing for SWC's of Sensors and Actuators.
- Built a **Python-based automation framework** to replace manual testing, integrated into the CI/CD pipeline for continuous testing and faster feedback.

Tools: Vector DaVinci Configurator Pro (5.18), CANOE, T32 Hardware Debugger, VSC, GCC and TASKING compilers, Ticketing tools are JIRA, IBM-RTC and Requirements are from DNG, RAPHODY and HSIS.

3. Linux Device Driver Engineer | Schneider Electric India Pvt. Ltd | Nov 2023 - July 2024

Project: Embedded Linux Device Driver & BSP Development for TI AM335x SoCs (BeagleBone Black)

- Developed and integrated **Linux kernel modules** for ARM Cortex-A8 based **TI AM335x** platform using **Embedded C**
 - Implemented **character device drivers** for peripherals such as UART, SPI, and I2C, enabling communication with external hardware components
 - Customized **Device Tree Source (DTS)** files to describe hardware peripherals and ensured proper driver-device binding using compatible strings.
 - Performed **board bring-up and BSP customization**, including kernel configuration, driver integration, and boot sequence validation
 - Developed **file operations (open, read, write, ioctl, release)** for character drivers to enable user-space communication
 - Implemented **memory-mapped I/O operations using ioremap ()** and handled low-level register access for peripheral control.
 - Debugged kernel and driver issues using **printk, dmesg, ftrace, and kgdb**, and validated hardware behavior using **oscilloscope and logic analyzer**.
 - Utilized kernel synchronization mechanisms (**mutex, spinlock, semaphore, completion**) to ensure safe access to shared resources.
- **Tools:** Strong proficiency in Embedded C programming, CRO, multi meter, oscilloscope, logic analyzer, T32 Hardware Debugger, UART and SPI Analyzer, VSC, GCC and TASKING compilers, Ticketing tools are JIRA.

4. Embedded Software Engineer Intern | Nayagara Technologies Ltd | March 2023 – Nov 2023

- Implemented **DC motor closed-loop speed control using PID on STM32F407** with PWM output and encoder feedback.
- Developed firmware in Embedded C, configuring timers, interrupts, and UART for system control and debugging.
- Debugged and validated motor control performance using ST-LINK, logic analyzer, and oscilloscope.

Education

- **B. Tech - Electrical and Electronics Engineering**
Chaitanya Bharathi Institute of Technology, Proddatur | 2023 | 75.35%.