

BALANAND ASWIND

Embedded Software Developer | Automotive Firmware | Motor Control | ASPICE
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PROFESSIONAL SUMMARY

Embedded Software Developer with 1+ years of automotive experience delivering Embedded C firmware for Integrated Starter Generator (ISG) controllers in 2- and 3-wheelers. Hands-on with Renesas 16-bit microcontrollers, sensed and sensorless BLDC motor control, CAN communication, and fault handling, across **3** microcontroller families and **5** communication protocols. Follows ASPICE-aligned processes from requirements to testing and holds a B.Tech in Electronics and Communication Engineering. Looking to contribute to automotive embedded and motor control projects.

TECHNICAL SKILLS

Languages:	Embedded C, C++, Python, Verilog, MATLAB
Microcontrollers:	Renesas 16-bit, STM32, 8051
Peripherals:	ADC, PWM, Timers, Watchdog Timer, GPIO, Interrupts
Protocols:	CAN, CAN FD, UART, I2C, SPI
Motor Control:	BLDC Commutation, Sensed and Sensorless Control, Engine Cranking, Charging Control, Torque Assist
Domain Skills:	Fault Handling, ECU Diagnostics, Control Algorithms
Development Skills:	Firmware Development, Debugging, Requirement-Based Development
Standards and Processes:	ASPICE, MISRA C, ISO 26262, IATF, AUTOSAR
Testing:	LDRA Static Analysis, TESSY Unit and Integration Testing, Simulink, ModelSim
Debug Tools:	Digital Oscilloscope, PCAN, Multimeter
Documentation:	UML Diagrams, Flow Charts, Software Requirements, Design Documents
Soft Skills:	Problem Solving, Team Collaboration, Time Management, Adaptability

PROFESSIONAL EXPERIENCE

Embedded Software Developer	Jun 2025 – Present
India Nippon Electricals Limited (R&D Tech Center), Hosur	
- Built and maintained firmware for automotive controllers on Renesas 16-bit microcontrollers, taking each feature from requirements through implementation, debugging, and hardware validation. - Configured 4 core peripherals (ADC, PWM, timers, and watchdog) to drive motor phases, sample feedback signals, and supervise program execution. - Translated system requirements into 4 deliverables (software requirements, architecture, design documents, and test criteria) that meet automotive process expectations. - Verified source code against MISRA C guidelines using static analysis to catch rule violations early in development. - Troubleshoot hardware-software interaction issues with 3 instruments (digital oscilloscope, PCAN, and multimeter), isolating faults in signals, timing, and CAN traffic. - Collaborated with 3 teams (hardware, system, and vehicle integration) to align ECU communication, diagnostics, and fault handling with vehicle control requirements.	

KEY ACHIEVEMENTS

- Delivered **2** ISG controller variants (sensed and sensorless) across **2** vehicle segments.
- Attained **100%** engine cranking success on the ISG controller.
- Secured **100%** MISRA C compliance through LDRA static analysis.
- Lifted vehicle mileage by **10%** with torque-assist control strategies.

PROJECTS

ISG Controller Development (Sensored and Sensorless) | Embedded C, Renesas 16-bit MCU, CAN, LDRA

Engineered an Integrated Starter Generator controller that cranks the engine at start-up and charges the battery while the engine runs.

- Developed code on Renesas automotive-grade microcontrollers, covering **2** rotor-sensing variants (sensored and sensorless) for 2- and 3-wheeler platforms.
- Implemented BLDC commutation, engine cranking, and battery charging control, achieving **100%** cranking and charging success meeting the SRS.
- Integrated CAN communication for ECU-to-ECU signal exchange and diagnostics, linking the controller with vehicle control systems.
- Ran LDRA analysis, closed all findings, and reached **100%** compliance with MISRA C rules.
- Authored ASPICE-compliant documentation covering **5** areas (requirements, architecture, design, functional flows, and test criteria), supporting traceable, requirement-based development.

ISG with Torque Assist | Embedded C, Motor Control, Control Algorithms

Enhanced the ISG system to improve vehicle fuel efficiency.

- Added torque-assist functionality that supplies extra engine torque during vehicle operation.
- Designed control strategies that reduce engine load under suitable operating conditions, improving vehicle mileage by **10%**.

Approximate 8-bit Multiplier (Academic Project) | Verilog, ModelSim

- Designed an approximate **8**-bit multiplier using custom half and full adders to reduce power and area.
- Coded Verilog RTL and verified functionality in ModelSim with testbenches under varied input conditions.
- Evaluated the trade-off among accuracy, power, and area.

EDUCATION

B.Tech, Electronics and Communication Engineering	2021 – 2025
SASTRA Deemed University, Thanjavur	CGPA: 7.24/10
Class 12, Board of Intermediate Education, Andhra Pradesh	2019 – 2021
Tirumala Junior College	Marks: 986/1000
Class 10, Board of Secondary Education, Andhra Pradesh	2018 – 2019
DAV Public School	CGPA: 10/10

CERTIFICATIONS

- MATLAB Onramp: Signal Processing, MathWorks
- STM32 Course, Udemy (in progress)