

# Chandana R

Senior Embedded Engineer

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## Professional Summary

Senior Embedded Engineer with 5+ years of experience in Linux kernel development, device drivers, bootloaders, and embedded firmware across ARM-based platforms. Skilled in porting and customizing Linux kernels, U-Boot, and GRUB for custom hardware, along with implementing Secure Boot and EFI-based boot flows. Strong background in Wi-Fi modules, Wi-Fi driver integration, and connectivity stacks for embedded systems. Experienced in Docker-based cross-compilation workflows, BSP adaptation, virtualization, and GPU passthrough on embedded Linux. Hands-on expertise in RTOS development, cross-core communication, and system bring-up on TI AM62x/AM64x and other SoCs. Known for solving complex system-level problems, optimizing performance, and delivering robust embedded solutions across Linux, RTOS, and automotive HMI environments.

## Educational Qualification

B.E. (ECE)	8.7 CGPA
PUC	78%
SSLC	86%

## Skills

- **Embedded Linux:** Kernel build/porting, device drivers, BSP customization, rootfs optimization
- **Bootloaders:** U-Boot customization, GRUB modification, Secure Boot, EFI/UEFI builds (including RPi5)
- **Connectivity:** Wi-Fi modules, Wi-Fi driver bring-up, wireless security, network stack debugging
- **Firmware & RTOS:** C/C++, FreeRTOS, bare-metal development, peripheral drivers (SPI/I<sup>2</sup>C/UART/ADC/DMA)
- **Cross-Compilation:** Docker-based build environments, toolchains, automated build workflows
- **System Bring-Up:** ARM board bring-up, RPMsg, multicore communication, hardware–software integration
- **Virtualization & GPU:** QEMU/KVM, PCIe passthrough, i915 GPU handling, IOMMU/VT-d
- **Debugging Tools:** JTAG/SWD, GDB, logic analyzers, oscilloscopes, protocol debugging
- **HMI & Control Systems:** Nextion/TFT displays, PID control, motor control (BLDC/Stepper)

## Professional Experience

### Senior Embedded Engineer

**NDR Co. Ltd.** | Mishima, Shizuoka, Japan

*Jul 2024 – Present*

- Ported and customized Linux kernels for TI AM62x/AM64xx platforms, including kernel configuration, driver enablement, and BSP adaptation.
- Modified, built, and deployed **U-Boot** and **GRUB** bootloaders for custom boards, including Secure Boot enablement and GRUB policy hardening.
- Performed board bring-up on ARM-based embedded platforms, enabling peripherals, debugging boot issues, and ensuring stable system initialization.
- Developed and debugged Linux kernel modules and device drivers, including PCIe passthrough for Intel/NVIDIA GPUs, i915 GPU handling, and IOMMU/VT-d configuration.
- Integrated and debugged **Wi-Fi modules and Wi-Fi drivers**, including firmware loading, regulatory settings, and connectivity stack validation.
- Built and tested **EFI/UEFI boot flows**, including custom EFI builds for Raspberry Pi 5 and troubleshooting firmware compatibility.
- Experimented with **booting Windows on Raspberry Pi 5**, addressing firmware, ACPI, and driver-level challenges.
- Performed UEFI-based virtualization testing (QEMU/KVM) and validated GPU passthrough functionality with Intel iGPUs.
- Designed and executed benchmarking scripts (iperf3, hdparm, dd, glmark2, UnixBench) and generated structured performance reports.
- Developed RTOS/M4 applications and IPC RPMsg echo examples on AM62x/AM64x, validating cross-core communication workflows.
- Built and maintained **Docker-based cross-compilation environments** for kernel, bootloader, and driver development.
- Automated kernel, bootloader, and rootfs build pipelines using containerized toolchains for reproducible builds.

### Embedded Software developer - R&D

**Whizdata Solutions LLP** | Bengaluru, India

*Jan 2022 to July 2024*

- Designed and implemented firmware in C/C++ for embedded systems.
- Developed applications on FreeRTOS and bare-metal platforms for automotive products.
- Integrated Nextion displays with microcontrollers (ESP32, Arduino) for HMI solutions.
- Debugged embedded systems using UART, logic analyzers, oscilloscopes, and other instrumentation tools.
- Implemented PID controllers for motor control systems, including stepper motors with S4D drivers on ESP32.
- Worked with multiple microcontroller families (ARM Cortex-M, AVR, PIC, STM32) to meet project requirements.
- Maintained firmware projects using Git for version control and documentation standards.

## VLSI Design Engineer

Proxelera Pvt. Ltd. | Bengaluru, India

June 2021 to Jan 2022

- Designed test architectures for SoCs and developed Verilog modules.
- Worked with DMA architectures, integrating DMA controllers with peripherals (UART, SPI, I<sup>2</sup>C, ADC).
- Strengthened knowledge of digital design and communication protocols, focusing on UART implementation.

## Projects

### 1. Rotary Evaporator

*A laboratory device for efficient solvent removal by evaporation*

- Implemented PID algorithms for precise temperature control.
- Developed motor control algorithms for BLDC motors using Hall-effect sensors.
- Designed vacuum control algorithms for stable pressure regulation.
- Programmed and interfaced HMI displays (Nextion) with the master microcontroller using UART (AT commands) and I<sup>2</sup>C protocols.
- Developed and scheduled multitasking applications in FreeRTOS.
- Integrated ADC sensors (temperature, pressure) into the control system.
- Debugged microcontroller communication via UART/I<sup>2</sup>C for reliable performance.

### 2. Syringe Pump Controller

*A motorized system to control syringe plunger movement for precise fluid handling*

- Interfaced and controlled stepper motors using the S4D driver.
- Developed firmware on ESP32 to control motor operations via the S4D driver.
- Implemented SPI communication protocol for device interfacing.
- Programmed and integrated a TFT display with ESP32 for system HMI.
- Built and tested applications on FreeRTOS for reliable real-time performance.

## Personal Details

Name: Chandana R

Date of Birth: 1999-05-02

Parents Name:

Father: Rajanna

Mother: Savitha

Address: Channel road, Vivekananda Nagar, T Narasipura, Mysore-571124.

Nationality: Indian

Languages: English, Kannada, Japanese (N4 Passed and Preparing for N3).

**Place: Japan**

**Chandana R**