

# MANIKANDA BHARATHI T

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## SUMMARY

Embedded Software Engineer with 2+ years of hands-on BSP development, device driver programming, and low-level hardware bring-up across ARM Cortex-A53 and Intel 12th Gen iGPU platforms. Expertise in peripheral driver development (I2C, DDC/CI protocol), interrupt handling (GIC), memory management, and hardware debugging with JTAG. Experienced with ASPICE-aligned safety practices, device tree customization, Yocto-based BSP workflows, and upstream-style code review via Gerrit. Actively building FreeRTOS/RTOS expertise to complement a strong C and Linux-native foundation.

## WORK EXPERIENCE

### Embedded Software Engineer

Feb 2024 – May 2026

LG Soft India — Bengaluru, KA · Contract via Duru Cooperation

- Developed and maintained DDC/CI protocol drivers on ARM Cortex-A53 and Intel 12th Gen iGPU platforms; handled I2C peripheral initialization, interrupt-driven state machines, GIC-based interrupt routing, and scalar firmware update pipelines across 10+ display variants
- Performed low-level BSP bring-up and platform debugging across ARM Cortex-A53 and Intel 12th Gen targets; root-caused signal integrity and protocol handshake failures via GIC interrupt analysis and register-level inspection using JTAG, Wireshark, and GDB
- Built hardware validation test suites (calibration, conformance, acceptance) aligned with ASPICE safety practices; designed test architecture that reduced regression turnaround by 40%
- Implemented memory management optimisations in embedded application pipelines, reducing memory footprint from ~80% to ~10% through profiling and buffer lifecycle analysis
- Maintained driver quality through upstream-style Gerrit review workflows and Jenkins CI/CD pipelines; authored device tree binding documentation and driver interface specs for cross-team consumption

## PROJECTS

### KartholOS Linux — Custom Yocto BSP Distribution

In Progress · Open Source

- Engineered a custom Yocto BSP layer (meta-kartholos) for x86/ARM platforms; implemented device tree customizations, kernel module integration, and U-Boot bootloader configuration from scratch

**Tech:** Yocto, Device Tree, U-Boot, Linux Kernel Modules, Buildroot, QEMU · [github.com/tmkbharathi/KartholOS](https://github.com/tmkbharathi/KartholOS)

### KartholOS — Bare-Metal x86 Operating System

In Progress · Open Source

- Implemented bootloader, GDT/IDT setup, paging (memory management), 8259 PIC interrupt controller, and context switching in C and x86 Assembly — no OS abstraction

**Tech:** x86 Assembly, C, Bootloader, Paging, Interrupt Handling, Memory Management · [github.com/tmkbharathi/KartholOS](https://github.com/tmkbharathi/KartholOS)

### LG AI Subtitles — iOS, Android & Flutter

Dec 2025 · LG Soft India

- Built end-to-end iOS app for real-time subtitle generation on webOS TVs using GStreamer audio pipelines and Whisper AI; reusable Android GStreamer + WebSocket control modules; initiated Flutter port

**Tech:** GStreamer, Whisper AI, iOS (Swift/Obj-C), Android (Java/Kotlin), Flutter, WebSocket, Instruments

### LG Calibration Studio — Medical (macOS)

Jul 2024 · LG Soft India

- Developed macOS calibration app for medical-grade monitors — DDC/CI peripheral control, scalar firmware update pipeline, ASPICE-aligned validation

**Tech:** DDC/CI, I2C, Scalar firmware update, macOS (Swift/Objective-C)

## SKILLS

**Languages:** C (primary), C++, Embedded C, Shell Scripting, Assembly (x86/ARM)

**BSP & Drivers:** Bare Metal, Linux Kernel Driver Development, Device Tree Customization, U-Boot, FreeRTOS (RTOS), BSP Bring-up, Platform Driver Development

**ARM & Hardware:** ARM Cortex-M/A, ARMv7/v8, Cortex-A53, GIC (Generic Interrupt Controller), MPU, JTAG, GPIO, Clock Controllers, Intel 12th Gen iGPU

**Protocols:** I2C, SPI, UART, USB, PCIe, DDC/CI

**Safety & Tools:** ASPICE, Memory Management, Gerrit (upstream review), Git, GDB, Wireshark, Yocto, Buildroot, Jenkins, Valgrind, Instruments, QEMU, perf, kgdb

## EDUCATION

### B.E. — Electrical and Electronics Engineering

Jun 2023

Alagappa Chettiar Government College of Engineering and Technology, Karaikudi · GPA: 8.5 / 10

## TRAINING & CERTIFICATION

### Embedded C Expert Program (ECEP)

Jun 2023 – Feb 2024

Emertxe Information Technologies, Bengaluru

- Intensive 8-month industry training in embedded systems: Embedded C/C++, data structures, Linux internals, bare-metal driver development on ARM Cortex-M, and system programming