Claims Investigation Committee Multi-Testing Input Device

ECE-4820: Electrical and Computer Engineering Design II

Dylan-Matthew Garza Daniel Baker Rohullah Sah

Department of Electrical and Computer Engineering
Western Michigan University

ZF Group
Auburn Hills, MI

Fall 2024

Faculty Advisor:
Dr. Janos Grantner

Sponsor Manager:
Patrick McNally

Table of Contents

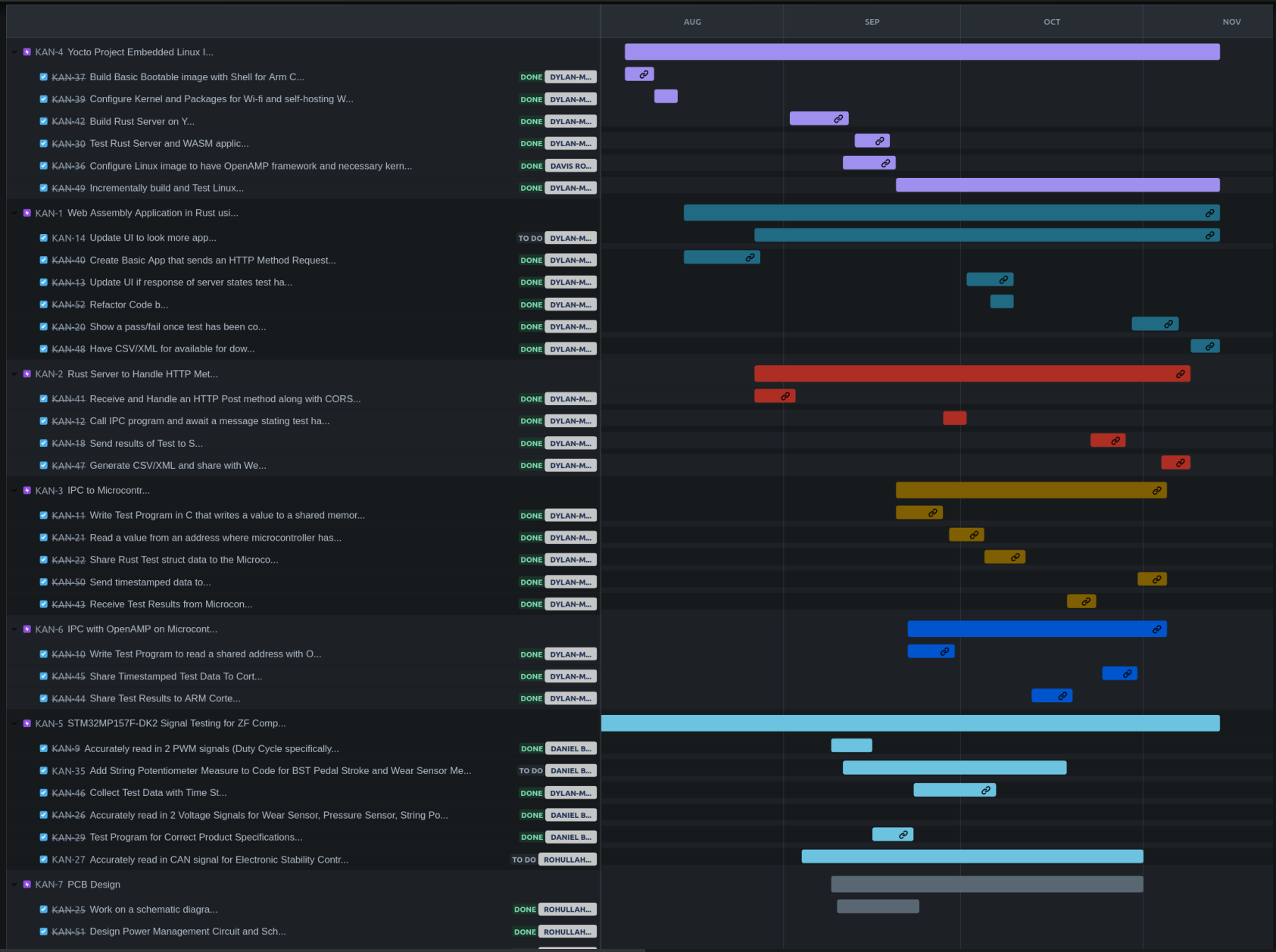
Project Specifications

What this project aims to accomplish:

1. **Device Interfacing**
   1. Properly read Device Signals using the ARM Cortex-M4 on the onboard microcontroller on the **STM32MP157F-DK2**:
      - PWM Duty Cycle
      - Frequency
      - Voltages through an analog-to-digital converter (ADC)
      - CAN frames
2. **Physical Components and Hardware**
   1. Printed Circuit Board (PCB) for interfacing with DUT
   2. PCB for scaling and managing power for the DUT and to the microcontroller
   3. Enclosure for PCBs and **STM32MP157F-DK2** board
3. **Software**
   1. Custom embedded **Linux** distribution that will run on the onboard ARM Cortex-A7 microprocessor on the **STM32MP157F-DK2**
   2. Simple user interface web-based application
   3. Custom Webserver to process information from web application to microcontroller
   4. Communicate collected information from ARM Cortex-M4 to ARM Cortex-A7
   5. Ability to download measured data, formatted as a CSV, through the web application

Project Specifications and Overview

Gantt Chart



Budget Projection

Custom Hardware Design

Firmware to Test Brake Signal Transmitter (BST)

Firmware to Test Continuous Wear Sensor (CWS)

Firmware to Test Pressure Sensor

Embedded Linux

Why use embedded Linux?

- Industry standard for any embedded operating system
- Access to free and open-source software (FOSS) and tools
- Networking and connectivity made easy
- Easily save/access data with filesystem

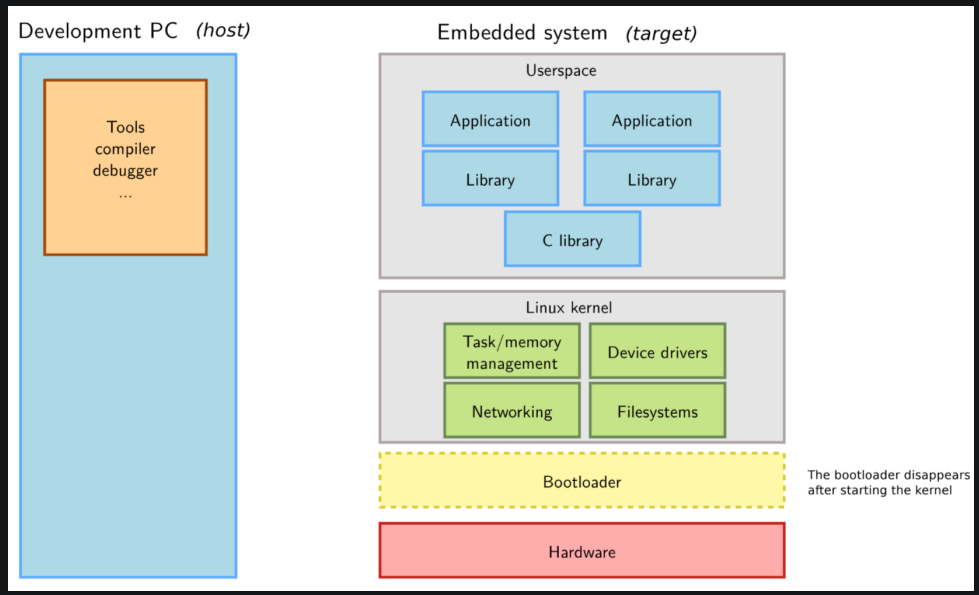


Figure 1: Source:https://bootlin.com/
Embedded Linux system architecture