

Thermostat Lab Reflection

The objective of this project was to design a smart thermostat prototype using a TI board for the CEO of SysTec. The goal was to create a low-level thermostat capable of sending data to SysTec's server software over Wi-Fi, laying the foundation for a future product. The system utilized a TMP006 temperature sensor, connected via I2C, to read the room temperature, with an LED indicating the output, and buttons for adjusting the set temperature. UART was employed to simulate data transmission to the server, displaying real-time status information.

A timer was used to manage task scheduling, with a 100 ms timer interrupt serving as the foundation for all scheduled tasks, such as checking buttons, reading temperatures, and sending data via UART. These tasks were integrated into a main loop that handled all key functionalities, including temperature readings, button press detection, heating control, and status output over UART.

Throughout the project, I leveraged three hardware architectures: Texas Instruments (TI), Microchip, and Freescale. Each architecture provided efficient GPIO configurations for button inputs and LED outputs, robust UART modules for communication, and the ability to integrate Wi-Fi modules for cloud-based connectivity in future thermostat designs.

The hardware I used provided 1 MB of Flash memory and 256 KB of RAM, which were sufficient to meet the storage requirements for both code and runtime operations of the

thermostat system. This architecture laid the groundwork for future enhancements and integration into a cloud-connected product.

