Module 7.1: Project One

Stanley Niles

Southern New Hampshire University

CS-350-R4868 Emerging Sys Arch & Tech 24EW4

Professor Steven Esposito

April 21st, 2024

***TI-CS3220 Board Evaluation for SysTec Smart Thermostat***

The TI-CS3220 board is integral to the SysTec smart thermostat, utilizing I2C for interfacing with the TMP006 temperature sensor and GPIO for user input via buttons and LED status indicators. UART communication enables efficient data logging and updates to a server. Despite the current model not utilizing Wi-Fi, the TI-CS3220 includes built-in Wi-Fi, which provides essential capabilities for future cloud connectivity enhancements. The board's robust storage options with 1 MB of Flash and 256 KB of RAM ensure it can support additional features and manage over-the-air updates effectively.

***NXP LPC55S69 Board Evaluation as an Alternative***

The NXP LPC55S69 board offers compatible I2C, UART, and GPIO interfaces, matching the TI (Texas Instruments) CS3220's capabilities for sensor communications, user interactions, and server connectivity. Unlike the TI-CS3220, the LPC55S69 requires an external Wi-Fi module, as do most of the offerings from NXP, introducing potential complexity and cost, but allowing for customized Wi-Fi solutions based on specific project requirements. It includes an internal temperature sensor adequate for basic monitoring tasks and precision measurements, although external sensors like the TMP006 might still be preferred. Equipped with 640 KB of RAM and up to 512 KB of Flash, the LPC55S69 supports complex applications and over-the-air updates, making it a strong candidate for robust system architectures.

***Microchip WBZ451 Curiosity Board Evaluation as an Alternative***

The Microchip WBZ451 Curiosity Board is another viable alternative for the SysTec smart thermostat project, supporting I2C, UART, and GPIO which ensures seamless integration with existing components such as temperature sensors and user interface elements. Its standout feature is the built-in Wi-Fi, which simplifies the system design by avoiding the need for additional communication modules, offering a more integrated solution compared to the TI CS3220 and NXP LPC55S69. The WBZ451 also features an integrated temperature sensor for convenient system monitoring, although for specialized high-precision applications, additional external sensors may be required. With its 1 MB of Flash and 128 KB of RAM, the board is well-equipped to handle the operational and connectivity demands of the smart thermostat, including firmware updates and cloud data management.

***Resources:***

All information pertaining to each of the boards listed above were found directly from the following manufacturer websites:

<https://www.ti.com/>

<https://www.microchip.com/>

https://www.nxp.com/