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Project Three Report

CS 350

Southern New Hampshire University

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In this thermostat project, we created a thermostat that had the ability to control heating and cooling systems, like the ones that you find in your own home. The wireless thermostat that was made was able to sense the temperature in the surrounding areas using the built-in electronic sensors. CS 3200 was using to develop this thermostat. Through the combination of using I2C, UART, and GPIO to support the peripherals and communication protocols. GPIO was used to control the system using the buttons located on the side of the board. Using the built in Wi-Fi connection, UART was able to communicate with different systems and the inter-connected peripherals communicated using the I2C driver. The I2C driver also returned temperature information.

The created thermostat was able to check temperature via the onboard sensor and check the temperature periodically. If the heat should turn off, the red LED on the board turns on. Information is compared to the users set point. The side buttons on the board were used to set point temperatures. The built-in thermostat was able to be operated by a SimpleLink MCU that can be controlled by the user because of the built in Wi-fi capabilities. This allows the thermostat that was created to be connected to the cloud via Wi-Fi.

Controller boards come in many different models, such as TI, Microchip, and Freescale boards. Freescale boards tend to be high performance but are a lower powered device because they are aimed for wireless/wired communications. “It's designed to address ever-increasing performance and protocol support requirements, as well as demand for low-cost operation for broadband access equipment, such as 3G/WiMAX/LTE base stations, RNCs, gateways and ATM/TDM/IP equipment.” (SimpleLink) Microchip LCD-Drive Microcontroller is an 8-bit MCU which features 64-128KB Flash and 4KB RAM. There are some differences between the three of them, along with some similarities. All three can support the required peripherals. Chips that are used on all three of the boards provide sufficient memory. All three types of boards allow for connections to the cloud and use Flash and RAM to create the thermostat. However, memory type on the Freescale board is an issue because Freescale boards use OTP memory. This means that reprogramming is not an option once the board is loaded. Out of all three types of boards, I believe that using a TI board is the better option over the other two because of the integrated temperature sensors.

References

*SimpleLink™ Wi-Fi® AT Command User's Guide*. (n.d.). https://www.ti.com/lit/ug/swru534d/swru534d.pdf?ts=1629441560442&ref\_url=https%253A%252F%252Fwww.ti.com%252Ftool%252FCC3220S-LAUNCHXL.