CS-350

Project One

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A smart thermostat needs to utilize several peripherals in order to function properly. I2C is required to read the temperature of the room via sensor, GPIO controls the LED lights to indicate when the heat is on and the GPIO interrupt allows for the use of buttons to change the desired temperature. UART is also needed in order to send the thermostat data to the server. According to the product specifications given by SysTec, the thermostat also needs to be able to connect to the cloud via Wi-Fi and have enough Flash and RAM to support the code.

The TI CC3220-LAUNCHXL was used for the creation of this prototype and meets all of the peripheral and product specifications listed by SysTec. It boasts a highly integrated Wi-Fi network processor, enhanced IoT networking security, and unique device identity, to transmit data via Wi-Fi securely. The LaunchPad has 256KB of RAM and 1MB of executable Flash, as well as external serial Flash (*Texas Instruments, n.d.*).

Research on Microchip products turned up the WFI32-IoT board, which is a highly integrated Wi-Fi MCU module. Like the TI LaunchPad, it has built in LED lights and a temperature sensor, and it also supports all of the necessary peripherals needed for this project. It has 32-Mbit external SPI Flash Memory, although no mention of RAM in the specification documents(*Microchip, 2022*). However, it appears that this device can be used with the up the WFI32E01PC, which is described as a “standalone and fully certified Wi-Fi module designed for industrial IoT Applications” (*Microchip, n.d.*). This product contains 1024KB of Flash and 320KB of RAM. According to Microchip’s site, this product also has rich peripheral options and supports cloud connectivity with best-in-class WLAN functions to cover the latest Wi-Fi security standard (*Microchip, n.d.*). While using two products might not be the most cost-efficient or ideal solution, it appears that it may produce the highest functioning product.

Freescale has been replaced with NXP, and the board most similar to TI and Microchip that I could find was the S08PT60-EVK. While it has LED lights and the ambient temperature sensor, it only has 60KB of Flash and 4 KB of RAM, although it also has 256 B of EEPROM (*NXP, n.d*.). It also claims to have rich peripheral options, although they are not listed, and I cannot assume that it would meet all of the requirements. The product details also do not mention anything about Wi-Fi or cloud connectivity, so this product should without a doubt be removed from consideration for future development.

References

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