CS 350 Module 7 Project One

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CS 350

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* Explain How the thermostat supports the peripherals used in the project

For this thermostat to be operational in its design, the board that it is utilized on needs to have a few peripherals available to it: GPIO, I2C, and UART. GPIO is the component that allows the program to interact with the buttons and the LED light. The I2C allows interaction with the program and the temperature sensor. Finally, the UART allows for output to the server via simulation of projecting the data via Wi-Fi. Hardware wise, it needs to have Wi-Fi capabilities and sufficient flash and RAM to support the functionality of the program on the device.

There are three major parties that are in the line of business to provide compatible boards: TI, Microchip, and Freescale. The board utilized with the creation of this test thermostat was the CC3220S-LAUNCHXL from TI. It has all the necessary peripherals mentioned above, Wi-Fi capabilities, and 256KB of ram which is more than enough to run the supported code (CC3220S-LAUNCHXL, n.d.).

Microchip offers a MCU module with GPIO, I2C, UART, WIFI capabilities, and 256KB RAM. The WFI32-IoT is about as close as you’re going to get as an identical model as the one mentioned by TI (*Pic32 WFI32E Curiosity Board | Microchip Technology*, n.d.).

Freescale is now NXP, and to find a similar model that meets all the requirements didn’t seem to exist. They have Wi-Fi items that either have limited RAM or a million features without GPIO, I2C, and/or UART. Even if it had all of these, it then would not have the necessary hardware for GPIO functionality with the test program.I have no recommendations for this brand at this time.

* Explain how the thermostat connects to the cloud via Wi-Fi

The thermostat connects to the cloud via Wi-Fi by utilizing the UART communication write function. It utilizes the onboard TCP/IP protocols to communicate via the Wi-Fi controller onboard. It will output data via this controller to the appropriate receiver within the cloud-based system.

* Discuss the architecture’s Flash and RAM that supports the code

The flash and RAM amongst the boards support the program by essentially “doing the work”. These memory devices allow for read/write of data within the program, along the board, and all interactions within the program, board, and incoming/outgoing information. The flash functions as the code memory bank while the RAM carries out the work of the program.

Citations

*CC3220S-LAUNCHXL*. CC3220S-LAUNCHXL Development kit | TI.com. (n.d.). https://www.ti.com/tool/CC3220S-LAUNCHXL

Pic32 WFI32E Curiosity Board | Microchip Technology. (n.d.). https://www.microchip.com/en-us/development-tool/EV12F11A