Project Report

Overall, this thermostat project has involved three main TI architecture peripherals: UART2 for asynchronous communication including the terminal output, I2C for temperature monitoring and recording, and GPIO for button and LED handling. All of these driver configurations are initialization functions have been built in both the final gpiointerrupt.c file as well as the ti\_drivers\_config.h header file to ensure proper functionalities. For a Microchip architecture UART is also known as USART that supports both synchronous and asynchronous modes. Similar to TI architecture, it also supports features like baud rate generation and framing error detection in Microchip architecture (Manning, 2021). I2C is renamed with MSSP that supports inter-integrated circuit and serial peripheral interface. GPIO, or PORT in Microchip architecture, takes the responsibility of reading and writing any communications between memory locations (Yida, 2022). In Freescale architecture, UART keeps the same name and supports both synchronous and asynchronous modes in a similar fashion. I2C is known as IIC or I2C\_B that supports master and slave modes. GPIO is commonly known as Port in Freescale and can also be access by reading or writing to corresponding memory locations (Abbas, 2023).

For TI architecture to connect to the cloud, its base platform, SimpleLink platform, provides a comprehensive software development kit that has the necessary drivers and libraries to develop applications. Once the application is finished, the wireless microcontrollers that support Wi-Fi connection can transmit data to its cloud service provider. Microchip architecture is based off of a Peripheral Interface Controller platform. This platform supports Wi-Fi connectivity through external modules and provides Harmony, its software framework, to supply programmers with the necessary libraries and tools they need to build applications. Freescale is built on Kinetis platform which uses ARM Cortex-M core similar to TI CC3220. Besides similar external Wi-Fi module connectivity, Freescale’s software platform, MQX, is also helpful for developers with abundant libraries and utilities to build RTOS applications (EETimes, 2011).

From a resource utilization perspective, TI CC3220 is built with 1MB of Flash and 256 KB of RAM which are suitable for building primary applications with wireless connectivity. Microchip architecture provides different resource options, some with 2MB Flash and 512 KB of RAM which is twice as much as TI CC3220. This makes Microchip architecture capable of handling more complex applications. Freescale architecture supplies similar options as TI with a diverse choices of Flash and RAM options. Therefore it is suited for a wide range of applications, from anything preliminary to something more complicated (Westfw, 2017).

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