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**Report**

**Peripherals**

The peripherals used in this project are UART (Universal Asynchronous Receiver-Transmitter), I2C (Inter-Integrated Circuit), and GPIO (General-Purpose Input/Output). The UART is used for communication with external devices via a serial communication. UART is used throughout the code for displaying messages, status, and sensor readings. For this project, UART serves the purpose of providing feedback and debugging information. I2C is employed for interfacing with temperature sensors. For this project, I2C facilitates communication with temperature sensors, allowing the microcontroller to read temperature data. It is used for both sensor detection during initialization and temperature data retrieval during runtime. GPIO is utilized for controlling LEDs and reading buttons. GPIO pins are configured as outputs to control the state of LEDs and as inputs to read the state of buttons. In this project, GPIO pins are used for both input (reading button states) and output (controlling LED states). They provide the interface for user interaction (buttons) and feedback (LEDs). GPIO interrupts are used to handle button presses, and GPIO write operations are used to control the LED state. The Microchip and Freescale architecture utilizes the same types of peripherals, but with their respective drivers and configurations. Each provide its own set of drivers and APIs for configuring and interacting with peripherals.

**Cloud**

The Wi-Fi modules on microcontrollers, like the CC3220S, are designed for IoT applications and support Wi-Fi connectivity. The thermostat firmware would interact with TI’s SimpleLink Wi-Fi APIs to establish a connection to the local Wi-Fi network and communicate with cloud servers using protocols like HTTP. Across TI, Microchip, and Freescale architectures, Wi-Fi connectivity is achieved using dedicated Wi-Fi modules and respective SDKs or libraries. The firmware interacts with Wi-Fi APIs to scan, configure, and connect to the local Wi-Fi network. After establishing a connection, the firmware communicates with cloud servers using protocols like HTTP or MQTT to exchange data and commands.

**Flash and RAM**

TI microcontrollers have a range of flash memory options. The specific flash size required depends on the size of the firmware, including the code, data, and any configuration parameters stored in flash. Similarly, TI microcontrollers offer various RAM sizes. The RAM requirements depend on the firmware’s runtime data storage needs, including variables, stacks, and buffers. Similar options are found in the Microchip and Freescale architectures. The selection of flash and RAM sizes for each architecture depends on the specific requirements of the thermostat firmware, including code size, data storage needs, and any additional functionalities.