7-1 Project Submission: Report

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**Reflection**

A smart thermostat is considered digital with the wireless connectivity feature that can alert anyone about the ambient temperature around its precise location. It works with digital sensors which they link with a boiler that can identify what is the real-time temperature within its location. Although, all thermostats either analog or digital can maintain a room temperature within the minimum than one degree of the default set room temperature. This device has introduced what a microcontroller does and how it works with sensors and actuators in communication.

Microchip (LCD Drive) Controller of an eight-bit direct contains features of sixty-four (64 KB) to a one hundred and twenty-eight kilobytes (128 KB) of flash memory with four kilobytes (4 KB) of random-access memory. This concludes to be the first eight-bit microcontroller unit to be used as a real-time clock, calendar date format, and time charge measurement peripheral for precise timing. This type of microcontroller unit is built and design to be used for low power to drive from the LCD display and to be set a feature easily like sleep mode.

Freescale (MPC8569E0 Power-Quicc 3) Semi-Conductor Processor that’s designed high performance chip and contains low power consumption. It controls the wireless connectivity and wired communication of different peripheral devices which are compatible to support a wide scale of WI-FI protocols and provides up to one point three gigahertz (1.3 GHz) within speed of performance. This processor is primarily designed for wireless access infrastructure, including applications such as wireless backhaul equipment. Because it supports many standards, protocols, and interconnects, it is also ideal for server switching cards, multiservice routers, and industrial applications. (NS ENERGY, 2009)

Texas Instrument Real-Time Microcontroller Unit (TMS320F28002x) contains a thirty-two-bit (32 bit) architecture designed to provide real-time manipulation for different input sensor devices. These devices are designed for efficiency in power electronics, including but not limited to high power density, high switching frequencies, and supporting the use of GaN and SiC technologies. The real-time control subsystem is based on the Texas Instruments (32-bit) C28x DSP core. (Mouser Electronics, 2020) Which has great performance and signal processing for floating- or fixed-point code to be compiles within a chip flash or SRAM.

In conclusion, these previous milestone projects that we have done in this course have given me great knowledge and the insights of an embedded software engineering program to work with multiple different sensors. All milestones have provided me to understand that they all correlate together to set an ambient temperature to a certain degree with the help. Of (GPIO/UART/Timer) features that a microcontroller has, and the well design architecture that gives reliability that demonstrates well performance to meet the specific user requirements as given. Applying my work experience to this course has got me better insights on how it is embedded to actuators using the sensors given to send and receive communication using a microcontroller or small chip. As I implemented some skills of SCADA in this course well I additionally, have gain new skills to coding in Embedded C programming language which is way different with the C sharp (C#) language I was used to from my work experience. What did help me the most was declarations and documentations of the TI Board from each header file to actually implement a proper setup for all milestone projects, which gave me the correct and required steps to modify each C file from project. This course will help me continue to strive for an opportunity to work with software embedded systems and be able to program a system with Embedded C which I hope to continue to learn as I continue to gain skills and work experience insights for my proposed career as a software engineer.

**References**

1. NS Energy. (2009). *Freescale Introduces New MPC8569E PowerQUICC III Communications Processor.* Retrieved From:[**https://www.nsenergybusiness.com/news/newsfreescale\_introduces\_new\_mpc8569e\_powerquicc\_iii\_communications\_processor\_090209/**](https://www.nsenergybusiness.com/news/newsfreescale_introduces_new_mpc8569e_powerquicc_iii_communications_processor_090209/)
2. Mouser Electronics. (2020). *Texas Instruments TMS320F28002x/TMS320F28002x-Q1 C2000 32-Bit MCUs.* Retrieved From:[**https://www.mouser.com/new/texas-instruments/ti-tms320f28002x-32-bit-mcus/**](https://www.mouser.com/new/texas-instruments/ti-tms320f28002x-32-bit-mcus/)