James Soto

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CS 350 Emerging System Architecture and Technology

Project Reflection

Intro

A wireless thermostat uses electronic sensors to detect and communicate the temperature of its environment, presenting the data to users. We employed the CS 3220 MCU in creating a smart thermostat with Wi-Fi capabilities. This is evident in specific code segments, like the 12C driver, which relays temperature details. The thermostat, powered by the CS 3220 Simplelink Wi-Fi microcontroller, is capable of various functions and tasks, including detecting temperature, humidity, pressure, ambient light, and air quality. This allows users to remotely configure and control the thermostat, even connecting to a cloud system through features like geofencing., thanks to its built-in Wi-Fi.

Microchip's LCD-Drive Microcontroller

The Microchip Technology PIC18F87J90 is an 8-bit direct LCD-drive microcontroller with nanoWatt Technology. It features 64-128 KB Flash program memory, 4 KB RAM, and a wide range of peripherals that include am LCD driver with software-programmable contrast control, Real-time clock and calendar (RTCC), Charge time measurement unit (CTMU) for capacitive touch sensing, 10-bit analog-to-digital converter (ADC), Multiple serial communication interfaces (SPI, I2C, UART), 16-bit timers, and 8-bit comparators. The PIC18F87J90 is a powerful and versatile microcontroller that can be used to create a wide variety of embedded systems. It offers a balance of features, performance, and power consumption that makes it ideal for a wide range of applications. The PIC18F87J90 LCD driver can support up to 192 pixels and 48 segments, the RTCC can be used to keep track of time and date, even when the microcontroller is in sleep mode, the CTMU can be used to measure the capacitance of a touch sensor, or to perform precise time measurements, the ADC can be used to measure analog signals, such as temperature or voltage, the serial communication interfaces can be used to communicate with other devices, such as sensors, actuators, or other microcontrollers, the timers can be used to generate periodic events, or to measure the time between events, and the comparators can be used to compare two analog signals, or to compare an analog signal to a digital value.

Freescale's 45-nm Communications' Processor

The MPC8569E PowerQUICC III is a high-performance, low-power communications processor from Freescale Semiconductor. It is based on the Power Architecture e500 core and is capable of scaling up to 1.33 GHz. The MPC8569E integrates a number of features that make it ideal for broadband access equipment. It features a four 32-bit RISC cores, Serial RapidIO and PCI Express high-speed interconnect interfaces, Integrated DDR memory controller with full ECC support, and Integrated security engine supporting DES, 3DES, MD-5, SHA-1/2, AES, RSA, RNG, Kasumi F8/F9, SNOW, and ARC-4. The MPC8569E also supports a flexible 36-bit physical address map and can be made part of a larger system address space through the mapping of translation windows. This makes it ideal for applications where a single processor needs to be able to access multiple devices and memory areas. The MPC8569E is a well-rounded communications processor that offers a good balance of performance, features, and price. It is a good choice for a wide range of applications where a high-performance, low-power processor is required.

TI's Real-Time Microcontroller

The Texas Instruments 32-bit TMS320F2802x/F2803x are a family of microcontrollers that are optimized for real-time control applications. They feature a 32-bit C28x core, a Control Law Accelerator (CLA), and a variety of peripherals that are designed for motor control, power electronics, and other demanding applications. The key features are a 32-bit C28x core with a clock speed of up to 60 MHz, Control Law Accelerator (CLA) for high-speed mathematical operations, 128 KB to 512 KB of flash memory, 32 KB to 64 KB of RAM, Up to 120 I/O pins, Integrated motor control peripherals, including PWM generators, ADCs, and DACs, and Integrated power electronics peripherals.

Sources

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