Project Synopsis (DESD)

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OTA Firmware Update

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Overview

Embedded systems are rapidly increasing in the industry, with increased demands and new innovation in technology, we are now able to upgrade the existing code (firmware) on our running system. Such implementation improves the product efficiency by fixing bugs, or because of more optimized firmware.

Hence we have selected this project, wherein we will implement the OTA (Over the Air) update of our device which is using **STM32F407** core.

Goals

1. **Checking for any available update:** Based on our programming approach, we will program our system to periodically check for any available firmware update suitable for our **core's (STM32F407)** architecture.

2. **Downloading the firmware:** Once the suitable firmware is available, after verifying the target architecture for the given firmware, it will be downloaded.

3. **Flashing the firmware:** After downloading the proper firmware, using **ESP32** we will flash our main board, based on the architecture of the "Core", our **ESP32** will flash the "core" using IAP (**In-Application Programming**)

Specifications

STM32F407: The STM32F407/417 lines are designed for medical, industrial and consumer applications where the high level of integration and performance, embedded memories and rich peripheral set inside packages as small as 10 x 10 mm are required.

The STM32F407/417 offers the performance of the Cortex™-M4 core (with floating point unit) running at 168 MHz. The STM32F407/417 product lines provide from 512 Kbytes to 1 MByte of Flash, 192 Kbytes of SRAM, and from 100 to 176 pins in packages as small as 10 x 10 mm.

ESP32: ESP32 has Xtensa® Dual-Core 32-bit LX6 microprocessors, which runs up to 600 DMIPS. The ESP32 will run on breakout boards and modules from 160Mhz upto 240MHz . That is very good speed for anything that requires a microcontroller with connectivity options.

ESP32 is capable of functioning reliably in industrial environments, with an operating temperature ranging from −40°C to +125°C.

Engineered for mobile devices, wearable electronics and IoT applications, ESP32 achieves ultra-low power consumption with a combination of several types of proprietary software.

Milestones

1. **Fixing the known bugs:**

    As mentioned earlier, our system can check for updated firmware over the web, once located, firmware can be downloaded and flashed.

2. **Improving the efficiency:**

    In case we more optimized application code/firmware is available, our system will notify the user (using LED, or by printing message on LCD) about the available update.

3. **Future Scope:**

    This project can be further extended in various domains, wherein **OTA firmware update** can be provided to various boards, which will increase the efficiency of the system.