**Design Specifications** [**(Read More In This Blog)**](https://www.exploreembedded.com/wiki/Overview_of_ESP32_features._What_do_they_practically_mean%3F)

1. Dual-Core Wi-Fi Module

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **ESP32** | **Cores** | **SRAM (KB)** | **SPI Flash (MB)** | **IO** | **ADC** | **I2C** | **UART** | **SPI** |
| 1 | ESP32-S2-MINI-1/1U | 1 | 320 | 4 | ~40 | 20 | 1 | 2 | 1 |
| 2 | ESP32-WROOM-32E/**UE** | 2 | 520 | 4 | ~30 | 16 | 1 | 2 | 1 |
| 3 | ESP32-S2-WROVER/I | 1 | 320 | 4 | ~40 | 20 | 1 | 2 | 1 |
| 4 | ESP32-S2-WROOM/I | 1 | 320 | 4 | ~40 | 20 | 1 | 2 | 1 |
| 5 | ESP32-WROVER-E/IE | 2 | 520 | 4 | ~30 | 16 | 1 | 2 | 1 |

* 1. Dual Core ESP32s have one Protocol CPU (PRO\_CPU) and one Application CPU (APP\_CPU). This allows the MCU to handle Wi-Fi, Peripherals like ADC, I2C, etc., on the PRO\_CPU while APP\_CPU is free for executing application firmware.

1. As many pins and peripherals as possible
   1. Our application requires at least 29 pins from the MCU for multiple interfaces like ADC, UART, I2C, I/O, SPI, etc., and this calls for an ESP32 with as many pins as possible.
2. IPEX Antenna Provision
   1. IPEX antenna is a must for our application due to long range Wi-Fi requirement. Many ESP32s support designing RF interfaces for external IPEX antennas, so we can consider using an ESP32 without built-in IPEX port as well but having a module with predesigned RF interface/IPEX port will reduce the design complexity on our side.
3. ESP32s use External SPI Flash for storing Firmware and execute code from SRAM. SRAM is also used to store data for the application, therefore big Flash Memory and SRAM should be preferred for our application.