



1. Overview

Espressif's ESP8266EX delivers highly integrated Wi-Fi SoC solution to meet users' continuous demands for efficient power usage, compact design and reliable performance in the Internet of Things industry.

With the complete and self-contained Wi-Fi networking capabilities, ESP8266EX can perform either as a standalone application or as the slave to a host MCU. When ESP8266EX hosts the application, it promptly boots up from the flash. The integrated high-speed cache helps to increase the system performance and optimize the system memory. Also, ESP8266EX can be applied to any microcontroller design as a Wi-Fi adaptor through SPI/SDIO or UART interfaces.

ESP8266EX integrates antenna switches, RF balun, power amplifier, low noise receive amplifier, filters and power management modules. The compact design minimizes the PCB size and requires minimal external circuitries.

Besides the Wi-Fi functionalities, ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor and on-chip SRAM. It can be interfaced with external sensors and other devices through the GPIOs. Software Development Kit (SDK) provides sample codes for various applications.

Espressif Systems' Smart Connectivity Platform (ESCP) enables sophisticated features including:

- Fast switch between sleep and wakeup mode for energy-efficient purpose;
- Adaptive radio biasing for low-power operation
- Advance signal processing
- Spur cancellation and RF co-existence mechanisms for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation

1.1. Wi-Fi Key Features

- 802.11 b/g/n support
- 802.11 n support (2.4 GHz), up to 72.2 Mbps
- Defragmentation
- 2 x virtual Wi-Fi interface
- Automatic beacon monitoring (hardware TSF)
- Support Infrastructure BSS Station mode/SoftAP mode/Promiscuous mode



1.2. Specifications

Table 1-1. Specifications

| Categories | Items | Parameters |
|------------|-----------------------------|---|
| Wi-Fi | Certification | Wi-Fi Alliance |
| | Protocols | 802.11 b/g/n (HT20) |
| | Frequency Range | 2.4 GHz ~ 2.5 GHz (2400 MHz ~ 2483.5 MHz) |
| | TX Power | 802.11 b: +20 dBm |
| | | 802.11 g: +17 dBm |
| | | 802.11 n: +14 dBm |
| | Rx Sensitivity | 802.11 b: -91 dbm (11 Mbps) |
| | | 802.11 g: -75 dbm (54 Mbps) |
| | | 802.11 n: -72 dbm (MCS7) |
| | Antenna | PCB Trace, External, IPEX Connector, Ceramic Chip |
| Hardware | CPU | Tensilica L106 32-bit processor |
| | Peripheral Interface | UART/SDIO/SPI/I2C/I2S/IR Remote Control |
| | | GPIO/ADC/PWM/LED Light & Button |
| | Operating Voltage | 2.5 V ~ 3.6 V |
| | Operating Current | Average value: 80 mA |
| | Operating Temperature Range | -40 °C ~ 125 °C |
| | Package Size | QFN32-pin (5 mm x 5 mm) |
| | External Interface | - |
| Software | Wi-Fi Mode | Station/SoftAP/SoftAP+Station |
| | Security | WPA/WPA2 |
| | Encryption | WEP/TKIP/AES |
| | Firmware Upgrade | UART Download / OTA (via network) |
| | Software Development | Supports Cloud Server Development / Firmware and SDK for fast on-chip programming |
| | Network Protocols | IPv4, TCP/UDP/HTTP |
| | User Configuration | AT Instruction Set, Cloud Server, Android/iOS App |

Note:

The TX power can be configured based on the actual user scenarios.



1.3. Applications

- Home appliances
- Home automation
- Smart plugs and lights
- Industrial wireless control
- Baby monitors
- IP cameras
- Sensor networks
- Wearable electronics
- Wi-Fi location-aware devices
- Security ID tags
- Wi-Fi position system beacons