

SiWx917 SoC

Product Brief v1.0

SiWx917 SoC Overview

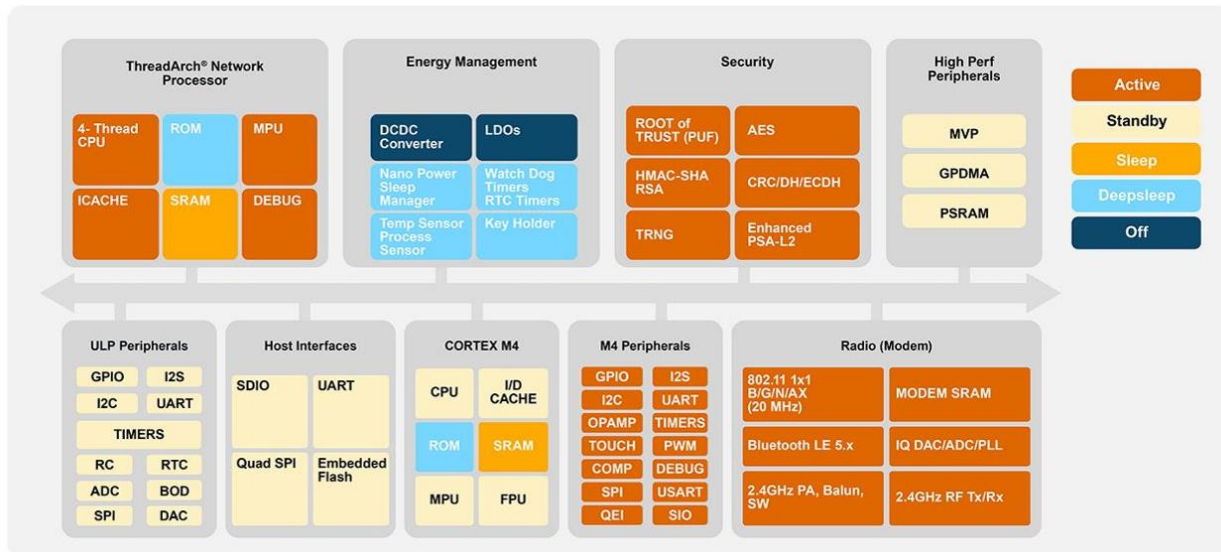
The SiWx917 SoC is ideal for ultra-low power IoT wireless devices using Wi-Fi, Bluetooth®, Matter, and IP networking for secure cloud connectivity. SiWx917 SoC includes an ultra-low power Wi-Fi 6 plus Bluetooth Low Energy (LE) 5.1 wireless CPU subsystem, and an integrated micro-controller (MCU) application subsystem, security, peripherals and power management subsystem all in a single 7x7 mm QFN package. The wireless subsystem consists of a multi-threaded processor (ThreadArch®), baseband digital signal processing, analog front end, 2.4GHz RF transceiver and integrated power amplifier. The application subsystem consists of an ARM® Cortex®-M4 processor with FPU, embedded SRAM, FLASH, AI/ML accelerator and enhanced PSA-L2 certifiable security engine. The integrated MCU is dedicated for peripheral and application-related processing, while the ThreadArch® runs the wireless and networking stacks on independent threads, providing a fully integrated single chip solution that is ready for a wide range of embedded wireless IoT applications.

Key Features

- Ultra-low power Wi-Fi 6 SoC
- Wi-Fi 6 features such as Target Wake Time (TWT), OFDMA, UL/DL MU-MIMO, BSS coloring
- Bluetooth Low Energy 5.1 with built-in coexistence mechanism
- Matter enabled and integrated Wi-Fi, Bluetooth and IP networking stacks
- Dual-core architecture - separate multi-threaded NWP and MCU processors
- Best-in-class security (PSA L2 Certifiable)
- SRAM/FLASH (with optional external PSRAM support)
- AI/ML accelerator engine

SiWx917 Applications include:

- Smart Homes
- Health and Fitness
- Medical
- Industrial
- Smart Building and Cities
- Asset Tracking



SiWx917 SoC Feature List

- **Ultra-Low Power Wireless System on a Chip**
 - Wi-Fi single band 2.4 GHz and Bluetooth Low Energy 5.1 wireless radio
 - Quad-thread ThreadArch® processor up to 160 MHz
 - ARM® Cortex®-M4 processor with FPU application MCU up to 180 MHz
 - Integrated baseband processor, RF transceiver, high-power amplifier, balun and T/R switch
 - Integrated PSA-L2 certifiable security engine, and AI/ML accelerator
 - Embedded SRAM up to 672 KB
 - Embedded Flash up to 8 MB and supports opt external PSRAM
- **Wi-Fi 6**
 - Compliant to IEEE 802.11ax, 2.4 GHz, 20 MHz, single-spatial stream
 - Supports 802.11ax features such as OFDMA, UL/DL MU-MIMO, and Target Wake Time (TWT)
 - Transmit power up to +21 dBm with integrated PA
 - Receive sensitivity as low as -98 dBm
 - Data Rates: 802.11ax MCS0 to MCS7
 - Operating frequency range: 2412 MHz - 2484 MHz
- **Bluetooth Low Energy 5.1**
 - Transmit power up to +19 dBm with integrated PA
 - Receive sensitivity: LE: -95 dBm, LR 125 Kbps: -106 dBm
 - Operating frequency range: 2402 MHz - 2480 MHz
 - Bluetooth Low Energy 1 Mbps, 2 Mbps and Long-Range modes (125 kbps, 500 kbps)
- **Microcontroller Subsystem**
 - ARM® Cortex®-M4 processor FPU core with up to 180 MHz
 - Integrated FPU, MPU, and NVIC
 - In-System Programming (ISP) and Over-the-Air (OTA) wireless firmware update
 - Power-On Reset (POR), Brown/Black-out and Black-out Detection
 - Rich set of Analog and Digital Peripherals
 - Digital Peripherals - SDIO, 1x USART, 2x UART, 4x SPI, 3x I2C, 2x I2S, SIO, PWM, QEI
 - Timers: 4x 16/32-bit, 1x 24-bit, WDT, RTC
 - Up to 46 GPIOs (GPIO Multiplexer)
 - Analog Peripherals - 12-bit 16-ch, 5 Msps ADC, 10-bit DAC
 - 3x Op-amps 2x Comparators, IR detector and Temp Sensor, 8 capacitive touch sensor inputs

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- **Best-in-Class Security**
 - PSA-L2 Certifiable
 - QSPI Secure XIP from Flash (w/ AES-XTS)
 - Secure Zone, Separated TEE
 - TRNG, Root of trust (PUF)
 - Secure Boot & OTA
 - Advanced Cryptographic Accelerators
- **Ultra-Low System Power Consumption**
 - Wi-Fi Standby Associated mode current: 50 µA @ 1-second interval
 - Deep sleep current < 1 µA, Sleep/Standby current (RAM retention) < 10 µA
 - Low MCU Sub-system active current: 19 µA/MHz in LP mode
- **Software and Protocol Support**
 - Integrated Wi-Fi stack, TCP/IP stack, Bluetooth stack supporting wireless coexistence
 - Matter over Wi-Fi with Bluetooth LE commissioning
 - Support for Embedded Client mode, Access Point mode, Concurrent Wi-Fi and Bluetooth LE mode
 - Supports advanced Wi-Fi and Networking security features: WPA2/WPA3-Personal and Enterprise security
 - Integrated TCP/IP stack supports HTTP/HTTPS, DHCP, SSL/TLS1.3, MQTT
 - Wireless firmware upgrade and provisioning
 - Supports host-less SoC mode with the internal ARM Cortex M4F application MCU
 - Supports hosted Transceiver/Radio Co-processor mode (RCP) and Network Co-processor (NCP) mode with external MCUs
- **Operating Conditions**
 - Wide operating supply range: 1.75 V to 3.63 V
 - Operating temperature: -40°C to +85/105°C (industrial grade)
- **Package Size**
 - QFN: 7.00 mm x 7.00 mm x 0.85 mm, 84 pin
- **Development Environment**
 - Simplicity Studio v5

Continue exploring the advantages of low-power Wi-Fi with the SiWx917 SoC, start with these great resources:

- [SiWx917 Wi-Fi 6 plus Bluetooth Low Energy 5.1 Wireless SoCs Specifications](#)
- [Wi-Fi 6: Addressing the Greater Density of Wi-Fi IoT Devices](#)
- [LPWF-101: The Future of Low-Power Wi-Fi in IoT Devices \(Works With 2022 On-Demand Video\)](#)

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