



Future Communications Integrated circuit Inc.

Product Data Sheet

FC9000

Brief Version of Datasheet

Date of Release: November 14, 2018

Version 1.3L

Contact information

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1. Device Overview

1.1. Introduction

The FC9000 is a highly integrated ultra-low power Wi-Fi system on a chip(SoC), which contains an 802.11b/g/n radio(PHY), a baseband processor, a media access controller(MAC), on-chip memory, and a host networking application processor, all on a single silicon die.

The SoC enables full offload capabilities, running the entire networking stack on chip so that no external network processor, CPU, or microcontroller is required, while many other SoCs optionally use a microcontroller.

FC9000 is a synthesis of breakthrough ultra low power technologies which enables extremely low power operation in the SoC. FC9000 shuts down every micro element of the chip that is not in use, which allows a near zero level of power consumption when not actively transmitting or receiving data. Such low power operation can extend the battery life as long as a year or more depending on the application. FC9000 also enables ultra low power transmitting and receiving modes when the SoC needs to be awake to exchange information with other devices. Advanced algorithms enable staying asleep until the exact moment required to wake up to transmit or receive.

The SoC is built from the ground up for the “Internet of Things” and is ideal for wearables, door locks, home appliances, sprinkler systems, thermostats, connected lighting, drop in video cameras and other devices that comprise the ConnectedHome.

1.2. Features

- Highly Integrated Ultra Low Power Wi-Fi® System On Chip
- Full Offload : SoC runs full Networking OS & TCP/IP Stack
- Wi-Fi Processor
 - IEEE 802.11b/g/n, 1x1 MIMO, 20MHz channel bandwidth, 2.4GHz
 - On-chip PA, LNA, and RF Switch
 - Wi-Fi Security (802.11i): WPA-Enterprise, WPA-Personal, WPA2-Enterprise, WPA2-Personal
 - Vendor EAP Types: EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2, PEAPv1, EAP-FAST, EAP-TLS
 - Operating Modes: Station, SoftAP, and Wi-Fi Direct® Modes
 - WPS2 for Easy Wi-Fi Provisioning
 - Connection Manager for Autonomous and Fast Wi-Fi Connections
- CPU Core Subsystem
 - ARM Cortex-M0+ Core w/ Clock Frequency of 40~200MHz
 - Embedded Memory

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- ROM : 192KBytes
- SRAM : 1664KBytes
- OTP : 16KBytes
- Hardware accelerators
 - General HW CRC Engine
 - HW Zeroing Function for Fast Booting
 - HW TCP Checksum
- Complete Software Stack
 - Comprehensive Networking Software Stack
 - Provides TCP/IP Stack : In the Form of Network Socket APIs(Application Programming Interfaces)
- Built-in Hardware Crypto Engines for Advanced Security
 - TLS/DTLS Security Protocol Functions
 - RSA Engine for Key Deliberate Generic Security Functions
- Built-in 4/2 Channel Auxiliary ADCs for Sensor Interfaces
 - 16-bit Sigma-Delta ADC : Differential 2 Channels
 - 12-bit SAR ADC : Single-Ended 4 Channels
 - Provides Dynamic Auto Switching Function
- Built-in Audio DAC
 - 16~22-bit Data Conversion
 - SNR : Min +95dB (A-Weighted, Line Out)
 - Supported Audio Sampling Rate : 8k/12k/16k/24k/32k/44.1k/48kHz
- Supports Various Interfaces
 - eMMC/SD Expanded Memory
 - SDIO Host/Slave Function
 - Quad-lane SPI for External Flash Control
 - 2 Universal Asynchronous Receivers and Transmitters(UARTs)
 - Serial Peripheral Interface(SPI) Master/Slave Interface
 - Inter-Integrated Circuit(I2C) Master/Slave Interface
 - I2S for Digital Audio Streaming
 - Pulse-Width Modulation(PWM)
 - Individually Programmable, Multiplexed GPIO Pins
 - JTAG
- Power Management Unit
 - On-Chip RTC (Real-time Clock)
 - Wake-up Control of Fast Booting or Full Booting with Minimal Initialization Time

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- Integrated DCDCs and LDOs
- Supports Three Ultra Low Power Sleep Modes
- Clock Source
 - 40MHz Crystal (+/- 20ppm) for Master Clock (Initial + temp + aging)
 - 32.768kHz Crystal (+/- 250ppm) for RTC Clock
 - Integrated 32kHz RC Oscillator
- Supply
 - Single Operating Voltage : 3.0 ~ 3.6V(typical: 3.3V)
 - Digital I/O Supply Voltage : 1.8V / 3.3V
- Package
 - 7mm × 7mm, 0.4mm Pitch, 60-Pin, QFN
- Operating Temperature Range: –40°C to 85°C
- Wi-Fi Alliance certifications:
 - Wi-Fi CERTIFIED n
 - Wi-Fi Direct®
 - Wi-Fi Protected Setup™

1.3. Applications

Full Offload System-on-Chip for IoT Applications, such as:

- Security Systems
- Door Locks
- Thermostats
- Garage Door Openers
- Blinds
- Lighting Control
- Sprinkler Systems
- Video Camera Security Systems
- Smart Appliances

