ATM2201/ATM2221
## Extreme Low Power Bluetooth 5.0 SoC

Atmosic™

Product Brief

Overview

The ATM2201/ATM2221 is part of a family of extreme low-power Bluetooth® 5 system-on-a-chip (SoC) solutions. This Bluetooth Low Energy SoC integrates a Bluetooth 5 radio with an ARM® Cortex® M0 processor and state-of-the-art power management to enable maximum lifetime in battery operated devices.

The extremely low power ATM2 series SoC is designed with an extensive set of peripherals and flexible I/O to support a wide variety of applications across the consumer, commercial, and industrial Internet of Things (IoT) markets.

The ATM2 series is available in a 40 pin QFN package (ATM2201) or 64 pin DR-QFN package (ATM2221) supporting additional I/O pins.
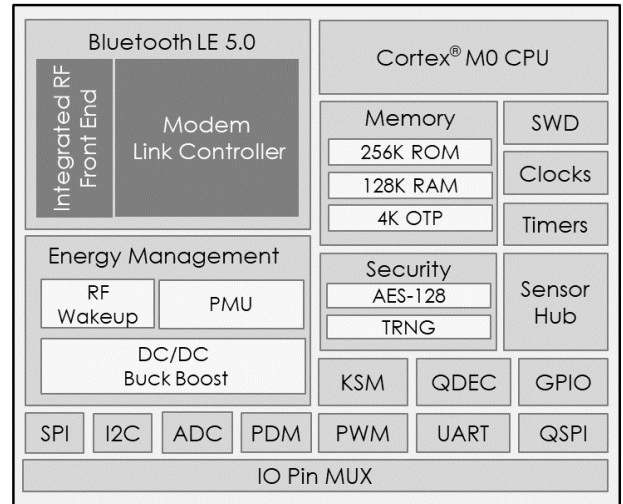
Applications

Industrial and Enterprise
- Beacons
- Remote Sensors
- Environmental Monitors

Healthcare
- Asset Trackers
- Locationing
- Wearables

Home
- Home Automation
- Remote Control
- Human Interface Devices (HID)
- Entertainment

Smart Cities
- Asset Trackers
- Beacons

Personal
- Gaming
- Wearables

Auto
- Key fobs and Accessories
- Infotainment

Features

- Bluetooth LE 5.0 compliant
- Fully integrated RF front-end
- 16 MHz ARM® Cortex® M0 CPU
- 256 KB ROM, 128 KB RAM, 4 KB OTP
- SWD for interactive debugging
- Integrated Power Management Unit (PMU)
- DC/DC Buck-Boost Converter
- RF Wakeup Receiver
- I2C, SPI, UART, PWM Peripherals
- Configurable GPIOs
- Quad SPI with Execute in Place (XIP)
- Application ADC (10-bit)
- Digital microphone input (PDM)
- Keyboard matrix controller (KSM)
- Quadrature decoder for mouse input (QDEC)
- 16 MHz / 32.768 kHz Crystal Oscillator
- AES 128 hardware
- True random number generator (TRNG)
- Sensor Hub

The ATM2 product family has designed-in features that make it the best option for a low power Bluetooth LE product.

The **Power Management Unit** is very efficient at providing the core and I/O power for the SoC, but can also be bypassed if a power source is available elsewhere in the system.

An integrated **Sensor Hub** is a configurable hardware element that can read data from external sensors and write to an external flash device on the quad SPI interface while all other power domains are powered down. The sensor hub can also trigger a wakeup of the CPU if the data read falls outside programmed thresholds

The independent **RF Wakeup Receiver** is designed to look for an incoming paging or wakeup signal while the rest of the SoC remains in a very low power state. The separate receiver supports short range reception of a configurable signal from a Bluetooth device, mobile phone, or a dedicated transmitter.

The extensive set of **Peripherals** on the ATM2 includes multiple UART cores, two I2C masters, two general purpose SPI masters, and a separate Quad SPI capable of supporting an external flash mapped directly to the CPU. Dedicated hardware supports a Pulse Density Modulated (PDM) digital microphone, multiple Pulse Width Modulation (PWM) outputs, Quadrature decoder (QDEC) for mouse inputs, Keyboard Matrix Controller (KSM), Analog Comparator, and Application ADC. Flexible pin muxing allows the needed signals to be routed to the I/O pins based on the application and product requirements.

A complete **Software Development Environment** allows developers to customize the existing ROM-based application or to develop a custom application that runs from external memory.

Available directly from Atmosic, an **Evaluation Kit** for both package variants supports performance evaluation, software customization, and complete product development.

Specifications

Bluetooth Version	Bluetooth LE 5.0
Data Rates Supported	2 Mb/s, 1 Mb/s, 500 kb/s, 125 kb/s
Output Power	-20 dBm to +4 dBm
Receive Sensitivity	-95 dBm @ 1 Mb/s
Input Voltage	1.1 V to 3.3 V
Power Consumption@ 3V	1.0 mA RX @-95 dBm 2.5 mA TX @0 dBm
CPU	16 MHz ARM® Cortex® M0 processor
On-Chip Memory	256 KB ROM, 128 KB RAM, 4 KB OTP
RAM Retention	16 KB to 128 KB in 16 KB steps
Security Hardware	AES-128, True Random Number Generator (TRNG)
GPIO	30 available on DR-QFN 16 available on QFN
Timers	4 General Purpose with separate dedicated Wakeup Timer.
Peripherals	I2C, SPI, QSPI, UART, PDM, PWM, QDEC, KSM, ADC
Operating Temperature Range	-40°C to +85°C
Package Options	ATM2201: 5x5 mm 40-pin QFN ATM2221: 6x6 mm 64-pin DR-QFN

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