Overview

The ATM34e & ATM34 Series SoCs are members of the Bluetooth-only and multi-protocol Bluetooth 6.0 / 802.15.4 extreme low-power system-on-chip (SoC) devices from Atmosic. The ATM34/e series SoC's integrate the Bluetooth 6.0 and 802.15.4 compliant radios with an ARM® Cortex® M33F application processor, Random Access Memory (RAM), Read-Only Memory (ROM), and nonvolatile memory (NVM), with ARM® TrustZone® enabled security features, and state-of-the-art power management to enable maximum lifetime in battery-operated devices.

The extremely low-power ATM34e/ATM34 Series comprises several products with resources scaled to encompass the various application and protocol requirements for Bluetooth 6.0 devices. Designed to extend the battery life for the Internet-of-Things, the radio uses only 0.95 mA in receive and only 2.5 mA in transmit at 0 dBm. Support for low-duty cycle operation allows systems to run for significantly extended periods without battery replacement. In addition, this series of SoCs from Atmosic supports operation from energy harvesting sources, including RF, photovoltaic, TEG (Thermoelectric generator), and motion. Innovative wake-up mechanisms are supported to provide options for further power consumption reduction.

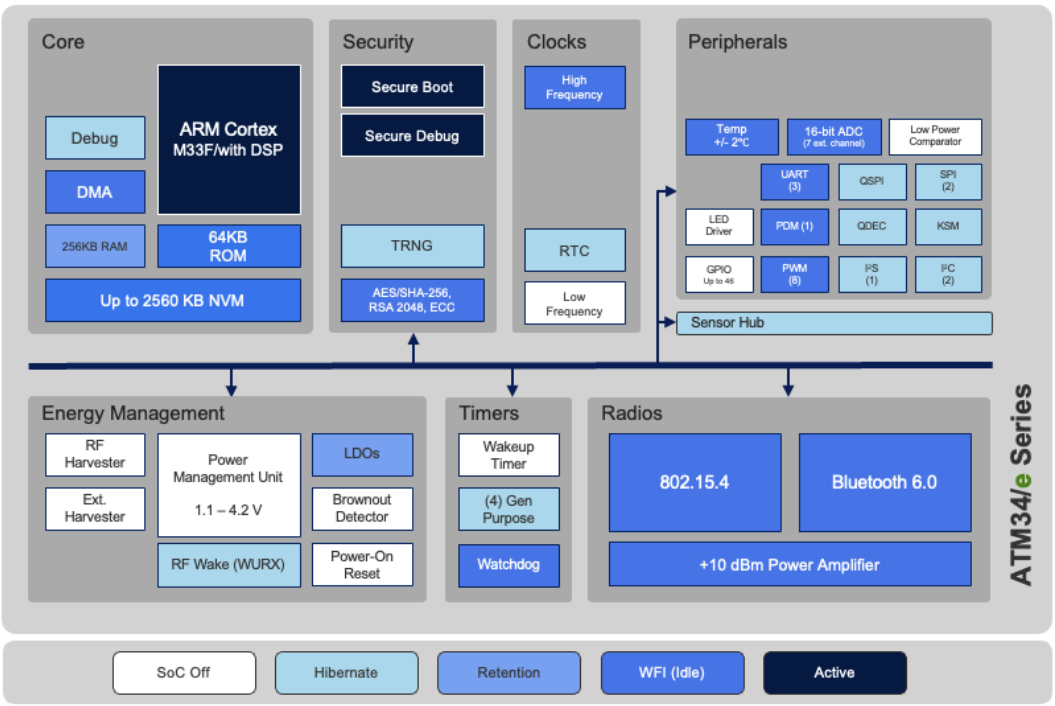
Applications

Industrial and Enterprise

- Industrial IoT Sensors
- Remote Monitors
- Building Management

Home

- Consumer Electronics
- Remote Controls
- Security
- Environmental Control & Advanced Home Automation
- Human Interface Devices (HID)
- Entertainment



ATM34e/ATM34 Series

Extreme Low Power SoC for Bluetooth 6.0 and 802.15.4

PRELIMINARY

Product Brief

Features

Standards Supported

- Bluetooth 6.0
  - Bluetooth Low Energy
  - 2 Mbps, 1 Mbps, & Long Range PHY rates
  - Bluetooth 5.4 Electronic Shelf Label
  - Bluetooth 6.0 Channel Sounding
- 802.15.4

MCU and Memory

- 64 MHz ARM® Cortex® M33F MCU
- 64 KB ROM, 256 KB RAM, up to 2560 KB NVM
- Rete. RAM: 16 KB to 256 KB in 16 KB step sizes
- 16 MHz / Optional 32.768 kHz Crystal Oscillator
- Sensor Hub for automated MCU-less operation
- UART Boot ROM option

Security

- ARM® TrustZone®, HW Root of Trust, Secure Boot, Secure Execution & Debug
- AES-128/256, SHA-2/HMAC 256 Encryption/Cryptographic Hardware Accelerators
- True random number generator (TRNG)

Energy Harvesting (ATM34e)

- On-chip RF Energy Harvesting
- Supports photovoltaic, thermal, motion and other energy harvesting technologies
- External Harvesting/Storage Interface

RF and Power Management

- Fully integrated RF front-end & RF Wakeup Receiver
- 1.1 V to 4.2 V battery input voltage with integrated Power Management Unit (PMU)
- Radio power consumption with 3 V battery
  - Rx (BLE) @ -97 dBm: 0.95 mA,
  - Rx (15.4) @ -103 dBm: 0.95 mA,
  - Tx @ 0 dBm: 2.5 mA
- SoC typ. power use with 3 V battery with PMU
  - Retention @ 32 KB RAM: TBD µA
  - Hibernate: 1.3 µA
  - SoC Off: 500 nA
  - SoC Off with Harvesting Enabled: 800 nA

RF Characteristics

- Transmit: -20 to +10 dBm
- Rx Sensitivity (BLE): -97 dBm
- Rx Sensitivity (15.4): -103 dBm

Interfaces

- I^2C, I^2S, SPI, UART, PWM, GPIOs
- Quad SPI
- 16-bit application ADC
- Digital microphone input (PDM)
- 8 x 20 Keyboard matrix controller (KSM)
- Quadrature decoder (QDEC)
- SWD for Interactive Debugging

Package Options

- 5x5 mm, 40-pin QFN (up to 21 GPIOs)
- 7x7 mm, 56-pin QFN (up to 31 GPIOs)

Feature Highlights

The ATM34e/ATM34 Series SoC has been specifically designed and optimized for low-power applications. ATM34e Series SoC has an on-chip RF Energy Harvester with a dedicated antenna port as well as a separate input for energy from photovoltaic, mechanical, and thermal harvesting devices.

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 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.

The integrated Sensor Hub on the ATM34e/ATM34 Series SoC is a configurable hardware element that can read data from external sensors and write to RAM or an external flash device on the quad SPI interface, while all other power domains remain powered down. The sensor hub can also be configured to directly send wireless messages or trigger a wakeup of the CPU if the data read falls outside pre-programmed thresholds.