

Product Brief

Overview

The ATM33/ATM33e Wireless SoC Series are part of a family of extreme low-power Bluetooth® 5.3 system-on-chip (SoC) solutions. This Bluetooth Low Energy SoC integrates a Bluetooth 5.3 compliant radio with ARM® Cortex® M33F application processor, 128 KB Random Access Memory (RAM), 64 KB Read Only Memory (ROM), 512 KB nonvolatile memory (NVM), 1 MB extended flash storage (in selected package), 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 ATM33/ATM33e Series SoC, with a 0.85 mA radio receiver and a 2.5 mA radio transmitter power consumption, is designed to extend battery life for the Internet-of-Things (IoT) markets. Support for low duty cycle operation allows systems to run for significantly longer 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

Healthcare

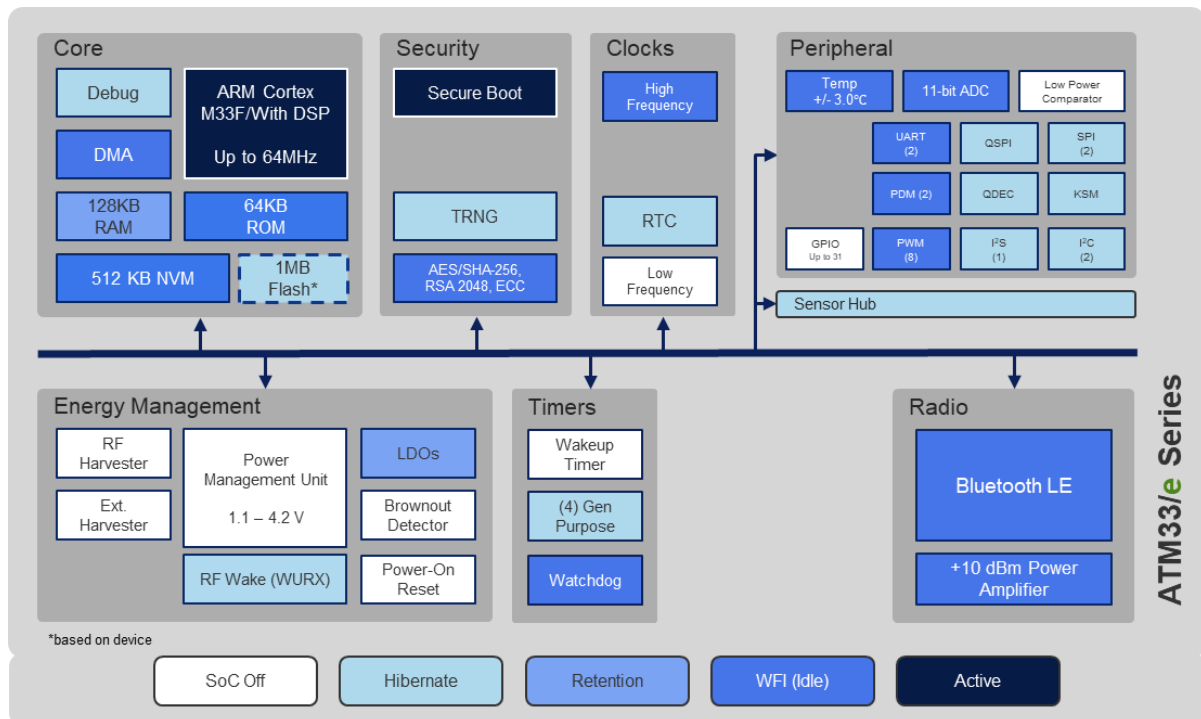
- Health monitors
- Sports and Fitness

Home

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

Personal

- Gaming
- Advanced Wearables
- Personal Tracking Devices



Product Brief

Features

Bluetooth LE

- Bluetooth Low-Energy 5.3 compliant
- 2 Mbps, 1 Mbps 500 kbps, and 125 kbps PHY rates
- Supports Bluetooth Angle-of-Arrival (AoA) and Angle-of-Departure (AoD) direction finding

MCU and Memory

- 64 MHz ARM® Cortex® M33F MCU
- 64 KB ROM, 128 KB RAM, 512 KB NVM, 1 MB extended flash storage (selected package)
- Retention RAM configuration: 16 KB to 128 KB in 16 KB step sizes
- 16 MHz / Optional 32.768 kHz Crystal Oscillator

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 (ATM33e)

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

RF and Power Management

- Fully integrated RF front-end
- Sensor Hub
- 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 @ -95 dBm: 0.85 mA
 - Tx @ 0 dBm: 2.5 mA
- SoC typical power consumption with 3 V battery including PMU
 - Retention @ 32 KB RAM: 1.8 µA
 - Hibernate: 1.3 µA
 - SoC Off: 400 nA
 - SoC Off with Harvesting Enabled: 700 nA

Interfaces

- I2C (2), I2S, SPI (2), UART (2), PWM (8), GPIOs (15, 18, 21 or 31 depending on the package option)

- Quad SPI
- 11-bit application ADC, 4 external, 5 internal channels, up to 2 Msps
- Two mono or one stereo digital microphone inputs (PDM)
- 8 x 20 Keyboard Matrix Controller (KSM)
- Quadrature Decoder (QDEC)
- SWD for interactive debugging

Package Options

- ATM3330e: 7x7 mm, 56-pin QFN (up to 31 GPIOs)
- ATM3330: 7x7 mm, 56-pin QFN (up to 31 GPIOs)
- ATM3325: 5x5 mm, 40-pin QFN (up to 21 GPIOs)
- ATM3325: 5x5 mm with extended storage, 40-pin QFN (up to 18 GPIOs)
- ATM3325: 49L WLCSP (up to 21 GPIOs)
- ATM3330e: 5x5 mm, 40-pin QFN (up to 15 GPIOs)

Feature Highlights

The ATM33/ATM33e Series SoC has designed-in features that make it the best option for a low power Bluetooth Low-Energy product. ATM33e Series SoC has on-chip **RF Energy Harvester** with a dedicated antenna port as well as a separate input for energy from photovoltaic, mechanical, or TEG 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 separate receiver supports short range reception of a configurable signal from a Bluetooth device, mobile phone, or a dedicated transmitter.

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 ATM33/ATM33e Series SoC also provides an integrated **Sensor Hub** which 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 are powered down. The sensor hub can also trigger a wakeup of the MCU if the data read falls outside programmed thresholds.

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