Overview

The ATM3201/ATM3221 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, RF Energy Harvester, and state-of-the-art energy management to enable “forever battery” and battery free operation in low-power devices.

With its ability to harvest energy from multiple sources and manage energy storage, the ATM3 is a flexible SoC solution for wide range of products across consumer, commercial, and industrial Internet of Things (IoT) markets.

The ATM3 series is available in a 40 pin QFN package (ATM3201) or 64 pin DR-QFN package (ATM3221) 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

- On-chip RF Energy Harvesting with dedicated antenna input
- Supports Photovoltaic, Thermal, Motion and other energy harvesting technologies
- 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
- External Harvesting/Storage Interface
- 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

©2020 Atmosic Technologies Inc. All rights reserved. Atmosic logo is a registered trademark of Atmosic Technologies Inc. All other trademarks are the properties of their respective holders. This product brief is subject to change without notice.

Doc. No. ATM32xx-002–PB-0053
The ATM3 product family has 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 Power Management Unit controls the harvesting and energy storage elements to optimize the sourcing of core and I/O power. Constant monitoring regulates chip operation based on harvested and stored energy.

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 receiver is designed for short range reception of a configurable signal from a Bluetooth device, mobile phone, or dedicated transmitter.

The extensive set of Peripherals on the ATM3 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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluetooth Version</td>
<td>BLE 5.0</td>
</tr>
<tr>
<td>Data Rates Supported</td>
<td>2 Mb/s, 1 Mb/s, 500 kb/s, 125 kb/s</td>
</tr>
<tr>
<td>Output Power</td>
<td>-20 dBm to +4 dBm</td>
</tr>
<tr>
<td>Receive Sensitivity</td>
<td>-95 dBm @ 1 Mb/s</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>1.1 V to 3.3 V</td>
</tr>
<tr>
<td>Power Consumption@ 3 V</td>
<td>1.0 mA RX @ -95 dBm</td>
</tr>
<tr>
<td></td>
<td>2.5 mA TX @ 0 dBm</td>
</tr>
<tr>
<td>CPU</td>
<td>16 MHz ARM® Cortex® M0 processor</td>
</tr>
<tr>
<td>On-Chip Memory</td>
<td>256 KB ROM, 128 KB RAM, 4 KB OTP</td>
</tr>
<tr>
<td>RAM Retention</td>
<td>16 KB to 128 KB in 16 KB steps</td>
</tr>
<tr>
<td>RF Energy Harvester</td>
<td>-7.5 dBm to 7.0 dBm input</td>
</tr>
<tr>
<td></td>
<td>900 MHz, 2.4 GHz RF Bands</td>
</tr>
<tr>
<td>Security Hardware</td>
<td>AES-128, True Random Number Generator (TRNG)</td>
</tr>
<tr>
<td>GPIO</td>
<td>30 available on DR-QFN</td>
</tr>
<tr>
<td></td>
<td>16 available on QFN</td>
</tr>
<tr>
<td>Timers</td>
<td>4 General Purpose with separate dedicated Wakeup Timer.</td>
</tr>
<tr>
<td>Peripherals</td>
<td>I2C, SPI, QSPI, UART, PDM, PWM, QDEC, KSM, ADC</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Package Options</td>
<td>ATM3201: 5x5 mm 40-pin QFN</td>
</tr>
<tr>
<td></td>
<td>ATM3221: 6x6 mm 64-pin DR-QFN</td>
</tr>
</tbody>
</table>

---

ATMOSIC TECHNOLOGIES - DISCLAIMER

This product brief is intended to be a general informational aid and not a substitute for any literature or labeling accompanying your purchase of the Atmosic product. Atmosic reserves the right to amend its product literature at any time without notice and for any reason, including to improve product design or function.

www.atmosic.com

Doc. No. ATM320x-002-PB-0053