

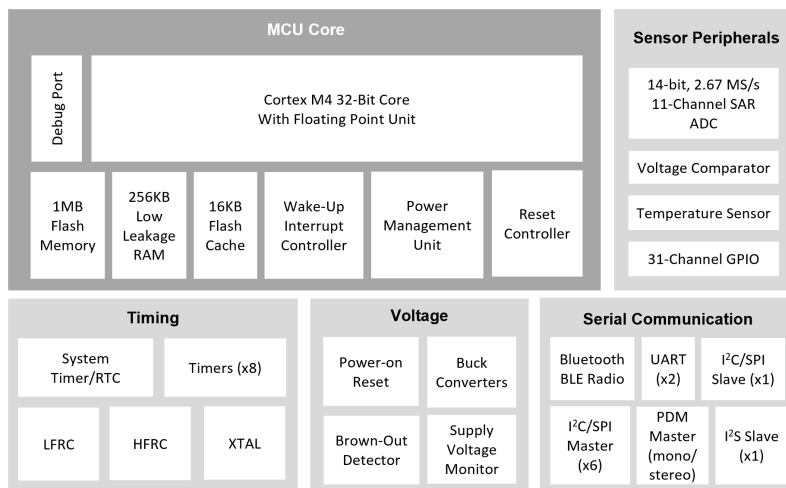
Apollo2 Blue Low Power MCU

Product Brief

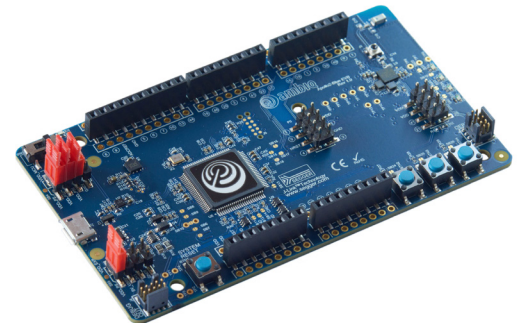
The Apollo2 MCU is an ultra-low power, highly integrated microcontroller designed for battery-powered and portable, mobile devices. At the heart of the Apollo2 Blue MCU is Ambiq's patented Subthreshold Power Optimized Technology (SPOT™) and a powerful Arm® Cortex®-M4 processor with Floating Point Unit. This combination dramatically reduces energy consumption while still enabling abundant application processing power to add greater capability and extended life to battery-operated devices.

With unprecedented levels of energy efficiency, the Apollo2 can deliver always-on keyword detection and voice assistant integration, local voice control, complex sensor processing, gesture recognition and activity monitoring applications within the smallest power budget.

By combining ultra-low power sensor conversion electronics with the powerful Arm Cortex-M4 processor with Floating Point Unit, the Apollo2 Blue MCU enables complex sensor processing tasks to be completed with unprecedented battery life. Weeks, months, and years of battery life are achievable while doing complex context detection, gesture recognition, and activity monitoring.



Block Diagram for the Ultra-Low Power Apollo2 Blue MCU



Apollo2 Blue AMA2BEVB (EVB)

Feature Highlights:

- An ideal solution for battery-powered applications requiring sensor measurement and data analysis.
- Serves as an applications processor for one or more sensors and has a fully integrated BLE 5 radio.
- Can measure analog sensor outputs using an integrated ultra-low power 14-bit ADC and digital sensor outputs using the integrated serial master ports.
- A host processor can communicate with the Apollo2 MCU over its serial slave port using the I²C, SPI or I²S protocol.
- Enables months and years of battery life for products only achieving days or months of battery life today.
- Implementation of the Cortex-M4F core delivers both greater performance and much lower power than 8-bit, 16-bit, and other comparable 32-bit cores.
- ADC is uniquely tuned for minimum power with a configurable measurement mode that does not require MCU intervention.
- Supported by a complete suite of standard software development tools.

Features and Specifications

Ultra-Low Supply Current

- < 10 μ A/MHz executing from flash at 3.3 V
- < 10 μ A/MHz executing from RAM at 3.3 V
- < 3 μ A deep sleep mode with RTC at 3.3 V (Bluetooth in shutdown)

High-Performance Arm Cortex-M4 Processor

- Up to 48 MHz clock frequency
- Floating Point Unit (FPU)
- Memory Protection Unit (MPU)
- Wake-up interrupt controller with 32 interrupts

Integrated Bluetooth® Wireless Technology BLE5-Compliant Low-Energy Sub-System

- RF sensitivity: -95 dBm
- Tx: 5 mA @ 0 dBm, Rx: 3.5 mA
- Tx output power: -40 dBm to +5 dBm
- AES 128-bit encryption
- Over-The-Air updates (OTA)
- Coexistence with other 2.4 GHz wireless
- Bluetooth SIG profiles support
- Enhanced data rate up to 2 Mbps feature capable

Built-in 32 kHz RCOU Ultra-low Power Memory

- Up to 1MB of flash memory for code/data
- Up to 256KB of low power RAM for code/data
- 16KB 2-way Associative Cache

Ultra-low Power Interface for On- and Off-Chip Sensors

- 14-bit ADC, 11 selectable input channels available
- Up to 2.67 MS/s sampling rate
- Voltage Comparator (VCOMP)
- Temperature sensor with $\pm 3^{\circ}$ C accuracy after calibration

Ultra-low Power Flexible Serial Peripherals

- 4x I²C/SPI masters with 128-byte bidirectional FIFO for communication with sensors, radios, and other peripherals
- 1x I²C/SPI slave for host communications with 256-bytes LRAM area for FIFO/host support
- 2x UART modules with 32-location Tx and Rx FIFOs
- PDM for mono and stereo audio microphones
- 1x I²S slave for PDM audio pass-through

Rich Set of Clock Sources

- 32.768 kHz crystal (XTAL) oscillator
- Low Frequency RC (LFRC) oscillator (1.024 kHz)
- High Frequency RC (HFRC) oscillator (48 MHz)
- RTC based on Ambiq's AM08X5/18X5 family

Wide Operating Range

- 1.755-3.63 V, -40°C to 85°C

Applications

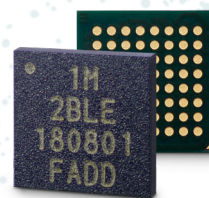
- Wearable electronics including smart watches
- Activity and fitness monitors
- Wireless sensors
- Consumer electronics
- Beacons
- Light control applications
- Remote sensing
- Wireless mice and keyboards
- Motion and tracking devices
- Alarms and security system
- Home automation
- Toys

Package Option

- 4 mm x 4 mm x 0.9 mm 64-pin LGA with up to 31 GPIO

Ordering Information

- AMA2B1KK-KLR (256KB RAM, 64-pin LGA)
- AMA2BEVB (EVB)



Apollo2 Blue AMA2B1KK-KLR



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