

## Product Brief

# Apollo 2 Ultra-Low Power Microcontroller

Apollo 2 MCU is the world's lowest power wearable and IoT platform with Ambiq Micro's patented Subthreshold Power Optimized Technology (SPOT). Apollo 2 integrates up to 1MB of flash memory and 256KB of RAM to accommodate various IoT applications including wireless connectivity and sensor fusion. Apollo 2 comes with various serial interfaces enabling connections with various sensor and radio hardware.

### Specifications and Features

- **Ultra-low supply current:**
  - < 10  $\mu$ A/MHz executing from flash at 3.3 V
  - < 10  $\mu$ A/MHz executing from RAM at 3.3 V
- **High-performance ARM Cortex-M4F Processor:**
  - Up to 48 MHz clock frequency
  - Floating point unit
  - Memory protection unit
  - Wake-up interrupt controller with 32 interrupts
- **Ultra-low power memory:**
  - Up to 1MB of flash memory for code/data
  - Up to 256KB of low leakage RAM for code/data
  - 16KB 2-way Associative Cache
- **Ultra-low power interface for off-chip sensors:**
  - 14 bit, 15-channel, up to 1.2 MSps ADC
  - Temperature sensor +/-3C accuracy
  - Voltage Comparator
- **Flexible serial peripherals:**
  - 6 x I2C/SPI master for communication with sensors, radios, and other peripherals
  - 1 x I2C/SPI slave for host communications
  - 2 x UART for communication with peripherals and legacy devices
  - PDM for Mono and Stereo audio microphones
- **Rich set of clock sources:**
  - 32.768 kHz XTAL oscillator
  - Low frequency RC oscillator – 1.024 kHz
  - High frequency RC oscillator – 48 MHz
  - RTC based on Ambiq's AM08X5/18X5 families
- **Compact package options:**
  - 2.5 x 2.5 mm (0.35mm) 49-pin CSP with 34 GPIO
  - 4.5 x 4.5 mm (0.5mm) 64-pin BGA with 50 GPIO

### Applications

- Wearable electronics
- Wireless sensors
- Activity and fitness monitors
- Consumer electronics
- Consumer medical devices
- Smart watches

### Description

Apollo 2 is the latest addition in the ultra-low power Apollo microcontroller family. This highly integrated MCU reduces power consumption by more than 50% compared to the first generation Apollo MCU, therefore empowering users with more processing capability with an even lower power budget. Apollo 2 opens door for enhanced applications performing complex context detection, gesture recognition, and activity monitoring with longer battery life in wearable electronics, activity & fitness monitors, IoT devices, and wireless sensors. All Apollo series MCUs take full advantage of Ambiq Micro's patented Subthreshold Power Optimized Technology (SPOT) Platform, setting a new industry benchmark in low power design.

