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Apollo2 MCU Datasheet

Doc. ID: DS-A2-0p92

Revision 0.92

May 2017

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Features

Ultra-low supply current:

- < 10 µA/MHz executing from flash at 3.3 V
- < 10 µA/MHz executing from RAM at 3.3 V
- < 3 µA deep sleep mode with RTC at 3.3 V

High-performance ARM Cortex-M4 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 1 MB of flash memory for code/data
- Up to 256 KB of low leakage RAM for code/data
- 16kB 2-way Associative Cache

Ultra-low power interface for off-chip sensors:

- 14 bit ADC at up to 1.2 MS/s, 11 simultaneous input channels available
- Voltage Comparator
- Temperature sensor with +/-3ºC accuracy

Flexible serial peripherals:

- 6x I^2C/SPI masters with 128-byte bidirectional FIFO for communication with sensors, radios, and other peripherals
- 1x I^2C/SPI slave for host communications with 256-byte LRAM area for FIFO/host support
- 2x UART modules with 32-location transmit and receive FIFOs
- PDM for mono and stereo audio microphone (256-word FIFO)
- 1x I^2S slave for PDM audio pass-through

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

Wide operating range: 1.755-3.63 V, –40 to 85°C

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

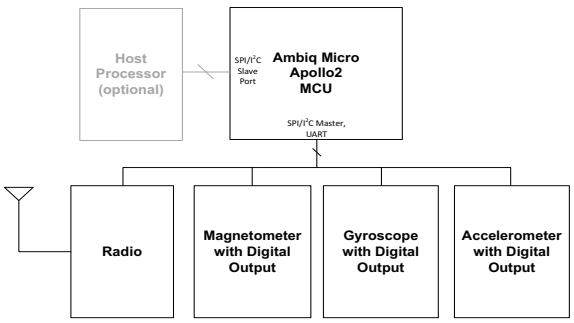
- Wearable electronics including smart watches
- Wireless sensors
- Activity and fitness monitors
- Consumer electronics
- Medical devices

Description

The Apollo2 MCU Family is an ultra-low power, highly integrated microcontroller designed for battery-powered devices including wearable electronics, activity & fitness monitors, and wireless sensors. By combining ultra-low power sensor conversion electronics with the powerful ARM Cortex-M4 processor with Floating Point Unit, the Apollo2 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. The Apollo2 MCU takes full advantage of Ambiq Micro's patented Subthreshold Power Optimized Technology (SPOT) Platform, setting a new industry benchmark in low power design.

The Apollo2 MCU is the 2nd generation controller building upon Ambiq Micro's Apollo MCU product family. The Apollo2 MCU integrates up to 1 MB of flash memory and 256 KB of RAM to accommodate radio and sensor overhead while still leaving plenty of space for application code. This microcontroller also includes serial master and UART ports for communicating with radios and sensors including accelerometers, gyroscopes, and magnetometers.

Typical Sensor Application Circuit for the Apollo2 MCU



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