

Low-Power, Dual-Core Microcontroller

General Description

The MAXQ3108 is a low-power microcontroller that features two high-performance MAXQ20 cores: a dedicated core (DSPCore) for intensive data processing and a user core (UserCore) for supervisory functions. The two cores can operate at different clock speeds, allowing lower system power consumption for even processing intensive applications. The UserCore can be configured to run at the lowest clock rate possible for monitoring the peripherals for communication activities, while the DSPCore runs at the highest speed. Each core has access to an independent math accelerator (a multiply/accumulate unit). The UserCore supports SPI™, I²C, two UART channels with one channel supporting IR carrier modulation, a trimmable real-time clock (RTC), battery-backed RTC registers, and data memory. The DSPCore is fully user programmable and configurable. With the standard 32,768Hz crystal, the DSPCore operates at 10.027MHz, while the UserCore runs at 5.014MHz.

Applications

Electricity Meters
Industrial Control
Battery-Powered and Portable Devices
Smart Transmitters
Medical Instrumentation

Features

- ◆ **High-Performance, Low-Power, Dual 16-Bit RISC Cores**
- ◆ **Approaches 1MIPS per MHz**
- ◆ **System Clock**
 - 10.027MHz (DSPCore)
 - 5.014MHz (UserCore)
- ◆ **33 Instructions**
- ◆ **Approximately 100ns Execution Time at 10.027MHz**
- ◆ **Three Independent Data Pointers Accelerate Data Movement with Automatic Increment/Decrement**
- ◆ **16-Bit Instruction Word, 16-Bit Data Bus**

- ◆ **16 x 16-Bit General-Purpose Working Registers for Each Core**
- ◆ **16-Level Hardware Stack for Each Core**
- ◆ **Hardware Support for Software Stack**
- ◆ **Memory Features**

UserCore
64KB Flash Program Memory
16B Battery-Backed (VBAT) Data SRAM
4KB Utility ROM
2KB Data SRAM; 10KB Total Data SRAM (If DSPCore Inactive)

DSPCore
8KB User-Loadable SRAM Code Memory
1KB Data SRAM

- ◆ **Peripherals**

FLL (10MHz Output with 32kHz Input)
SPI Master, I²C Master
Two UART Channels (One Supports IR Carrier Modulation)
Math Accelerator for Each Core
Three Manchester Decoder and Cubic Sinc Filter Channels for Interfacing to DS8102 Delta-Sigma Modulators
Two 16-Bit Programmable Timer/Counters
RTC with Alarms and Digital Trim, Dedicated Battery-Backup Pin (VBAT)
Two Programmable Pulse Generators
Independent Watchdog Timer for Each Core
External Interrupts
JTAG Interface

- ◆ **Operating Modes**

Stop Mode: 0.1µA typ
Active Current at 10MHz and V_{DD} = 2.0V: 1.0mA typ

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE
MAXQ3108-FFN+	-40°C to +85°C	28 TSSOP

+Denotes a lead(Pb)-free/RoHS-compliant package.

Pin Configuration appears at end of data sheet.

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Note: Some revisions of this device may incorporate deviations from published specifications known as errata. Multiple revisions of any device may be simultaneously available through various sales channels. For information about device errata, go to: www.maxim-ic.com/errata.