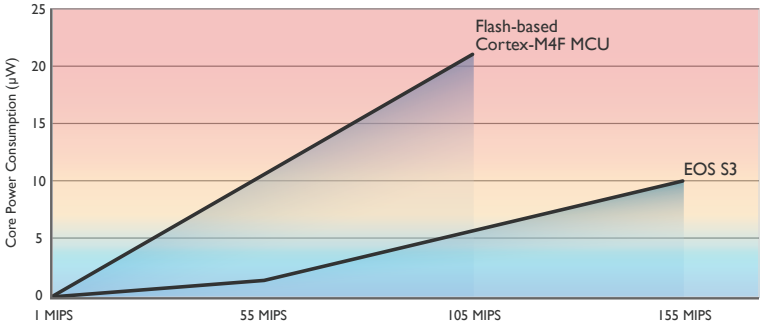
EOS™

QuickLogic's sensor processing solutions combine ultra-low power always-listening voice processing with ultra-low power always-on motion processing to enable a new class of context driven use cases. Hierarchical hardware and software computation with fine grained power control allows ultra flexible system level power optimization.

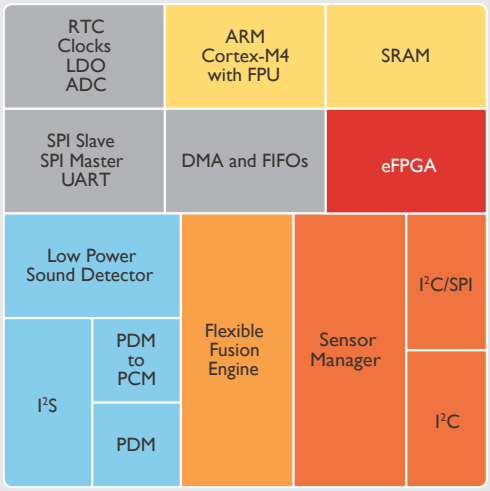
The EOS Solution

Capable of running the most fundamental algorithms as well as the most computational-intensive algorithms on the market today, with extra capacity in anticipation of future software requirements:

- Unique multi core architecture provides world class computational capability at industry leading power levels
- Delivers 80% more compute capability than traditional ARM® Cortex®-M4 based microcontroller sensor hub solutions at a fraction of the power consumption
- Dedicated voice processing architecture enables always-on voice applications at less than 280 µAmps



EOS S3 Sensor Processing Platform Block Diagram



- **Sensor Manager** – Autonomously handles management and control of all sensors
- **Flexible Fusion Engine (FFE)** – 10 MHz DSP-like processor handles always-on computational processing at one fourth the power
- **eFPGA** – Allows implementation of custom logic functions and I/O expansions
- **Voice Processing** – Hard-coded Low Power Sound Detector (LPSD) and PDM to PCM conversion minimizes voice power
- **ARM Cortex-M4 with FPU** – Up to 80 MHz and 512 KB SRAM for general purpose processing and running O/S
- **Serial I/O** – SPI Master/Slave, I²C, UART
- **System** – DMA, Integrated RTC, Oscillators, ADC, LDO

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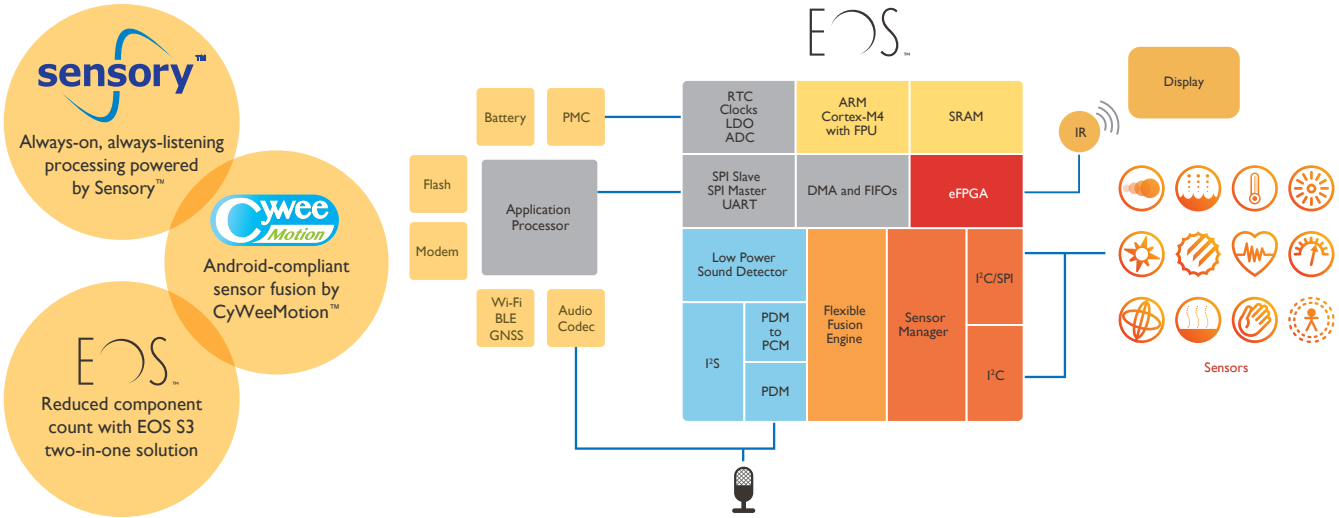
Applications

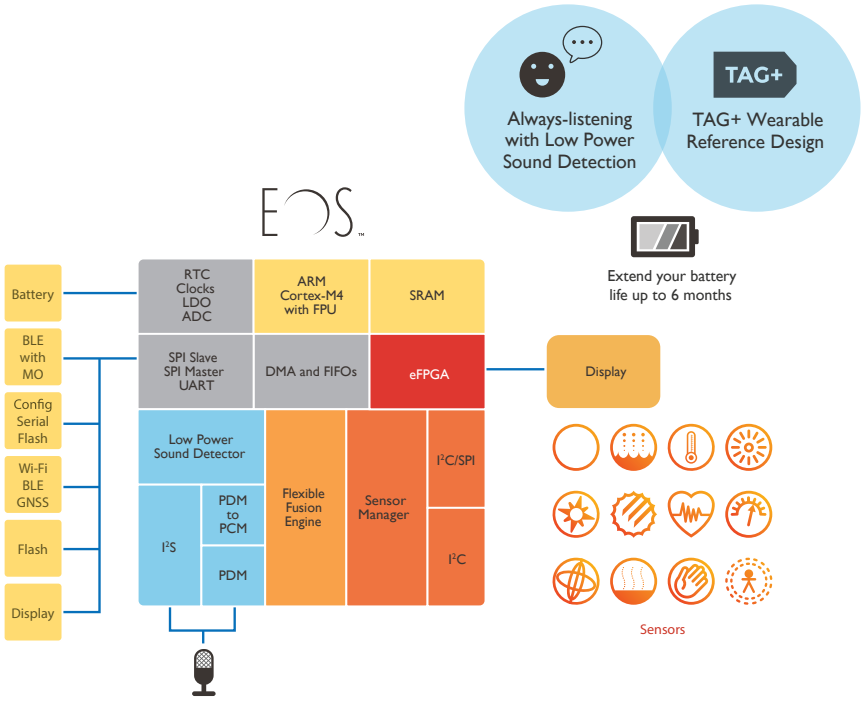
EOS S3 Smartphone Application — Always-Listening and Always-On

Always-on Motion Sensing enables more natural user interactions for an immersive user experience. QuickLogic's sensor processing solutions allow ultra-low power implementations of sophisticated algorithms.



EOS S3 Wearable Band Application — Enables feature-rich bands with long battery life

Complete ultra-low power sensor processing solutions facilitates new use cases for wearable devices.



Features

ARM Cortex-M4 Subsystem	▪ Cortex-M4 MCU with Floating Point Unit (FPU) ▪ 512 KB SRAM for code and data memory ▪ 32 nested vectored interrupt; wake-up interrupt controller ▪ 2-wire serial debug interface ▪ 75 µWatts/MHz; ~64 µWatts/DMIPS
Flexible Fusion Engine	▪ Ultra-low power µDSP-like engine for always-on, real-time processing ▪ 50 KB SRAM for code, 16 KB SRAM for data ▪ 30 µWatts/MHz; as low as 16 µWatts/DMIPS
Audio Support	▪ As low as 443µW for always-on voice recognition (voices present 30% of the time). Including a low power mic, system power as low as 276µA at the battery (assuming 85% efficient regulators and 3.7V battery) ▪ I^2S Interface or PDM interface support ▪ PDM to PCM decoder for hardware-based, ultra-low power conversion ▪ Sensory Low Power Sound Detector for voice recognition applications
Interface Support	▪ SPI slave interface to applications processor ▪ SPI master for serial flash memories and external SPI-based peripherals ▪ I^2C master (x2) and SPI master (x1) for external sensors and other components
Power Management	▪ Integrated LDO for on-chip voltage regulation ▪ Low power with fast wake up ▪ Programmable low power modes (deep sleep, sleep with retention, active) ▪ Multiple power domains (MCU, FFE, programmable logic, always-on) ▪ Firmware initiated sleep entry ▪ Wakeup from internal or external events
ADC Support	▪ Two 12-bit sigma delta ADC for battery monitoring or other low speed peripherals
Sensory Audio	▪ Speaker-independent fixed trigger "OK Google" ▪ Speaker-dependent fixed trigger with enrollment ▪ User defined trigger "Open Sesame!" User defined passphrase "What is my step count?" ▪ Phrase-spotted commands "What is my step count?" ▪ No slow, cloud processing required; most features run 'deeply embedded'
Programmable Fabric	▪ 2,400 effective logic cells of re-programmable logic for hardware customization
Packages	▪ 2.7x2.3mm, 0.35mm ball pitch, 42-ball WLCSP ▪ 3.5x3.5mm, 0.4mm ball pitch, 64-ball BGA
Process & Voltage Support	▪ 40nm; 1.0V or 1.1V VCC ▪ Independent VCCIO banks (1.71V to 3.6V) ▪ ADC VCC (1.71V to 3.6V)
Software Support	▪ Industry standard: IAR or Eclipse+gcc ▪ Drivers for Android and RTOS

About QuickLogic: QuickLogic Corporation (NASDAQ: QUIK) enables OEMs to maximize battery life for highly differentiated, immersive user experiences with Smartphone, Wearable and IoT devices. QuickLogic delivers these benefits through industry leading ultra-low power customer programmable SoC semiconductor solutions, embedded software, and algorithm solutions for always-on voice and sensor processing. The company's embedded FPGA initiative also enables SoC designers to easily implement post production changes without expensive and time-consuming redesign. For more information about QuickLogic, visit **www.quicklogic.com**.

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