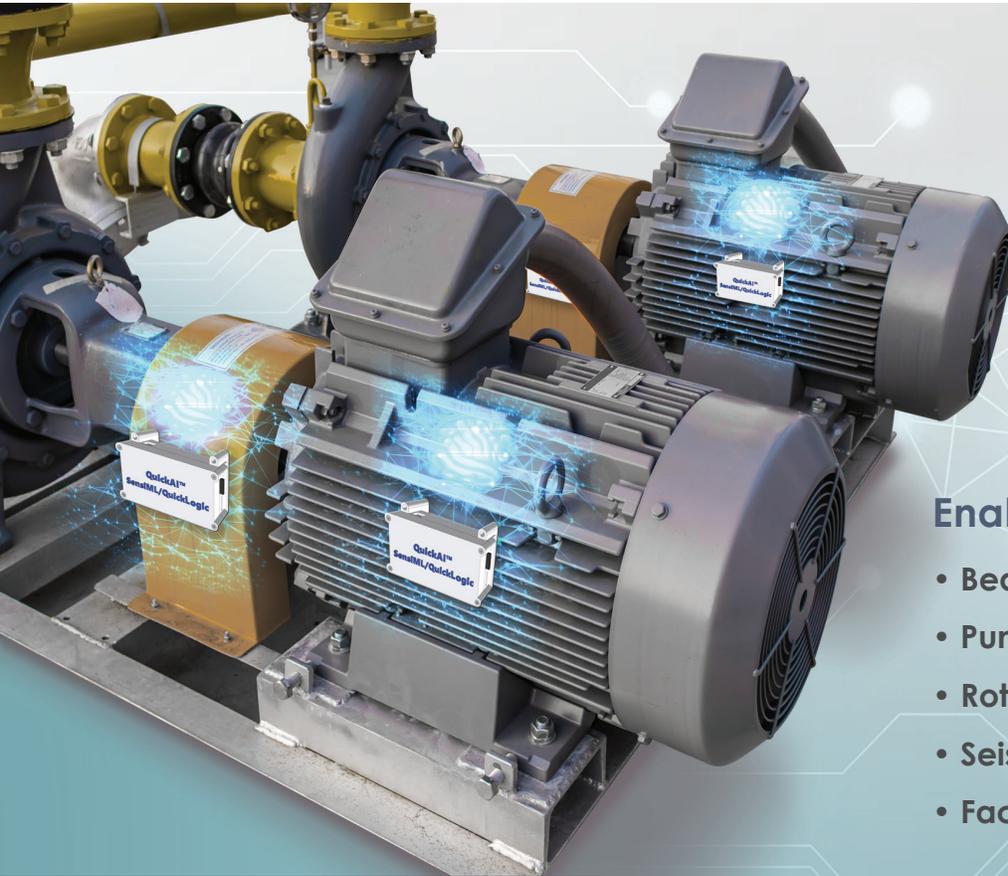


QuickAI HW/SW Platform

Enabling Artificial Intelligence (AI) at the IoT Endpoint



Enabling Industry 4.0

- Bearing/Shaft Faults
- Pump Cavitation/Flow Inefficiency
- Rotating Machinery Faults
- Seismic/Structural Health Monitoring
- Factory Predictive Maintenance

The new QuickAI™ platform provides an all-inclusive low power solution and development environment to incorporate the benefits of practical AI in endpoint applications. It features technology, software and toolkits from QuickLogic™ and SensiML™ which together have formed a tightly coupled platform to solve the challenges associated with the implementation of AI for endpoint applications.

Solution

QuickAI: An integrated HW/SW solution that enables AI for IoT devices

- Low power sensor processing
- Data capture lab for data collection, labeling and training
- Data analytics SW for AI model and classifier generation
- Neurons for AI computing
- Automatic firmware development for the S3AI multi-core SoC platform
- eFPGA low power implementation for HW acceleration and feature extraction

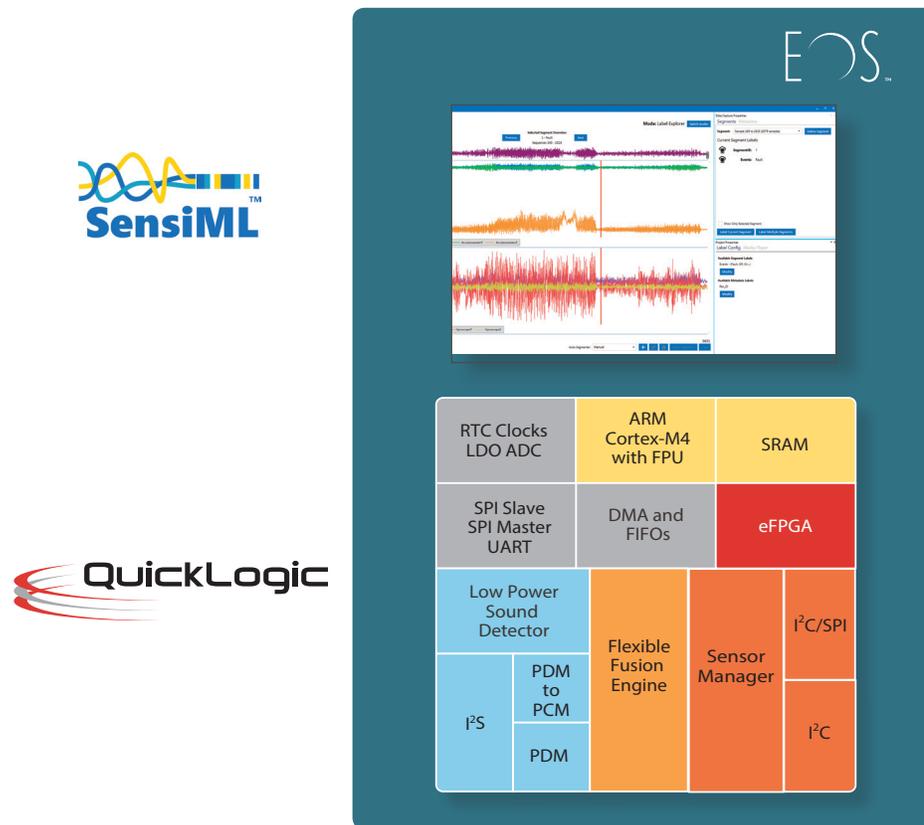
Target Applications

- Industrial IoT
- Predictive Maintenance
- Structural Health Monitoring
- Wearable/Consumer IoT

Addressing the Challenges of Endpoint Applications

- Companies developing endpoint devices often lack the resources to work effectively with the complexities of AI development: data collection and training, feature extraction, and classifier and AI model generation.
- Industrial and manufacturing OEMs, who are working to address the Industry 4.0 initiative, lack the data science and firmware engineering resources needed to develop AI models and implement them in a low power SoC platform.
- The diversity and uniqueness of endpoint use cases drive the need to develop application-specific algorithms and models, thus requiring large SW teams to address numerous product lines, and even derivative products, that exhibit different sensor characteristics.
- Once endpoint devices are deployed, manufacturers must have a plan to manage the distributed endpoints, leverage the information they collect, and often update AI models remotely.

QuickAI Platform Solution for Time Series



Data Analytics Toolkit

- Application SW to make AI scalable
- Collect, segments and labels the data
- Conducts both the learning and the inference
- Feature extraction is automated
- Enables customers without expertise in data science to create algorithms
- Generates the .bin file and downloads it to the target QuickAI HW Platform

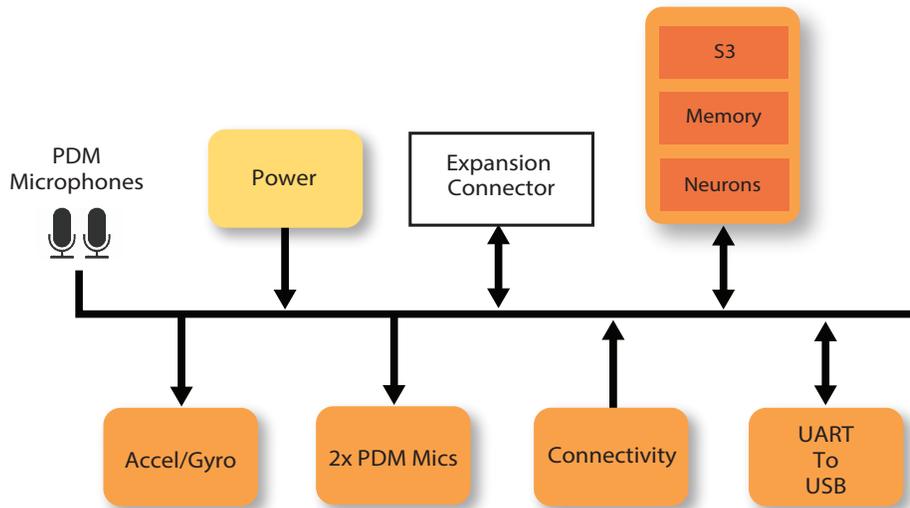
Low power SoC with FPGA

- Optimal multi-core (ARM Cortex® M4F and FFE) processor
- eFPGA fabric for feature extraction
- QuickAI HDK platform for evaluation/development

SensiML Analytics Toolkit for AI

- An end-to-end software suite that provides OEMs with a straightforward process for developing machine learning sensor algorithms.
- Enables OEMs to quickly and easily leverage the power of local AI in edge, endpoint and wearable designs without the need for significant data science or firmware engineering resources.
- Automatically optimizes AI models to minimize power consumption in targeted SoCs, and is designed specifically to leverage the inherent benefits of heterogeneous multi-core SoC architectures and eFPGA technology.
- For more information about the SensiML Analytics Toolkit for AI, please visit www.sensiml.com.

Industrial Evaluation Platform: Merced HDK



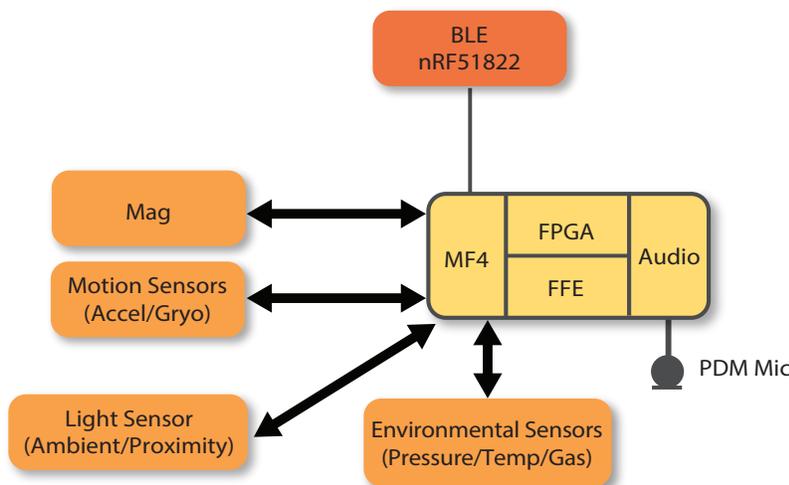
Target Applications

- Industrial IoT
- Predictive maintenance

Features

- HDK Platform can be used for evaluation of S3AI and SensiML Tool Kit
- Enables AI (data collection, feature extraction and classifier building) with motion and acoustic sensor processing
- Connects to SensiML Toolkit

Wearable/Consumer Evaluation Platform: ChilKat HDK



Target Applications

- Wearable, IoT
- Elderly care
- Animal tracker

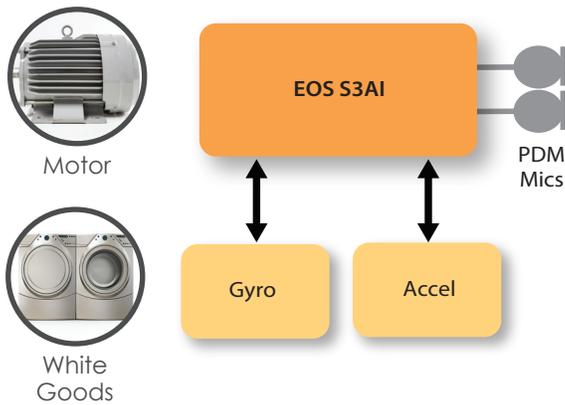
Audio Features

- PDM audio mic support 16KHz ODR
- Low power sound detection
- Fixed trigger and Keyword Detection (KWD)

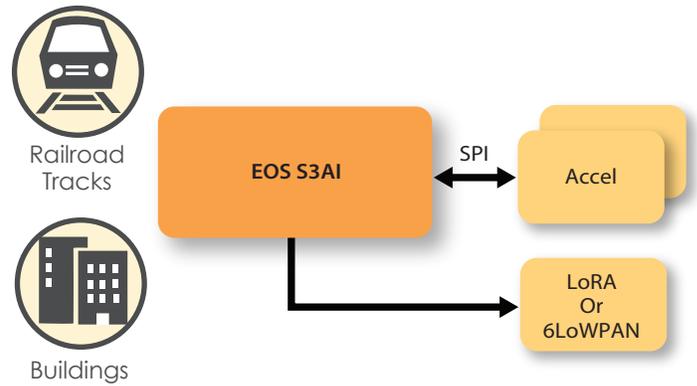
SensiML AI Features

- Data Capture Lab
- Analytics Studio
- Firmware generation for ChilKat HDK

Industrial Predictive Maintenance



SHM (Structural Health Monitoring)



Industrial Predictive Maintenance

- Endpoint learning API allows model tuning for machine specific variances
- Endpoint AI decreases system bandwidth, latency, power

Algorithm Development: SensiML Toolkit for Time Series Sensors

- Data collection, segmenting, labeling
- Sensor input: motion, audio, pressure, and temp/humidity
- Feature extraction
- Model building

FPGA Features

- Sensor Data Creation → Feature Extraction → Feature Vector
- Hardware accelerator (FFT, MFCC, etc.)

FFE Enabled Features

- Event trigger (segmentation)
- Feature extraction for simpler features
- Ultra-low power AON function

Structural Health Monitoring

- Damage detection
- Structural Integrity reporting

Algorithm Development: SensiML Toolkit for Time Series Sensors

- Data collection, segmenting, labeling
- Sensor input: motion, audio
- Feature extraction
- Model building

FPGA Features

- Sensor Data Creation → Feature Extraction → Feature Vector
- Hardware accelerator (FFT, etc.)

FFE Enabled Features

- Event trigger (segmentation)
- Feature extraction for simpler features
- Vibration (high precision accel) analysis



For more information about QuickLogic, please visit www.quicklogic.com

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