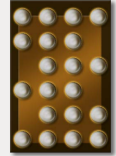# NDP102
Neural Decision Processor™
Always-On Sensor Applications Processor

SYNTIANT
NDP102AD
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PRODUCT BRIEF

The Syntiant® NDP architecture is built from the ground up to run deep learning algorithms. Packaged with the Syntiant Core 1™ neural network, the NDP102 is capable of performing sensor processing at under 100uW and can operate as a standalone always-on component of a larger system. It achieves breakthrough performance by highly coupled computation and memory, exploiting the vast inherent parallelism of deep learning and computing at only required numerical precision. The NDP102 combines these elements to deliver 100x improvement in efficiency and performance compared to current MCU-based architectures.

The native neural network processing capabilities embedded in the Syntiant Core 1 eliminate the need for intermediate compilers and, works seamlessly with popular machine learning frameworks such as TensorFlow, which greatly reduces time to market and helps assure expected performance.

NDP102's programmable Syntiant Core I deep neural network supports sensor applications for a variety of use cases including, but not limited to:

+ Event detection
+ Pressure sensing
+ Gesture recognition
+ Anomaly detection
+ Sensor fusion

BLOCK DIAGRAM
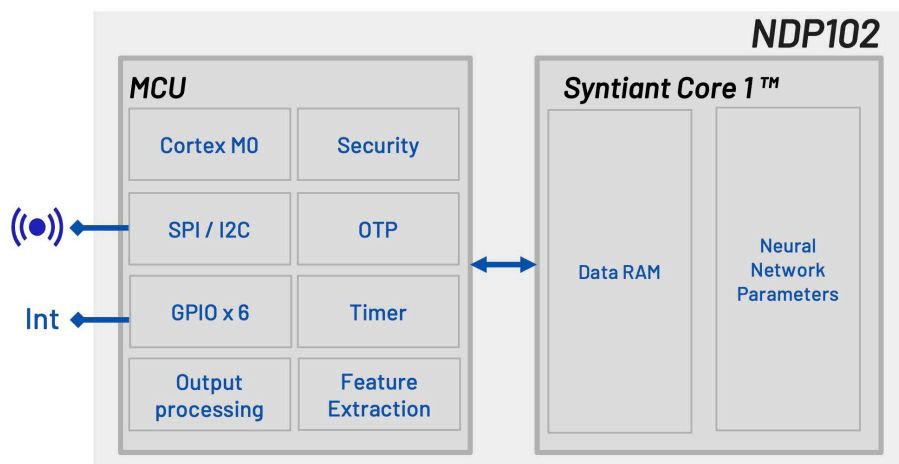
KEY FEATURES & BENEFITS

+ Under 100uW active power consumption in always-on sensor applications

+ 1.71mm x 2.51mm 20-pin eWLB (0.4mm ball pitch)

+ Syntiant Core 1 neural processor

+ Hardware feature extraction up to 100Hz frame rate and up to 40 frequency bins per frame

+ Fully connected neural network, supporting up to 589k parameters

+ Deeply embedded ARM cortex-M0 processor with 112KB SRAM

+ Six GPIO pins with programmable direction and drive strength

+ 12C serial interface for sensor applications

+ On-chip programmable clock divider

+ External serial flash boot

+ Integrated clock multiplier and dividers support low-frequency clock source or external clocking

+ On board firmware security and authentication

+ Software Development Kit (SDK) integrates in any software environment

+ Training Development Kit (TDK) to enable the use of standard frameworks such as TensorFlow for customer-programmed applications

APPLICATIONS

The NDP102 enables always-on sensor processing in the smallest systems, and serves as a powerful AI interface in a tiny package with near-zero power consumption

MOBILE PHONES   SMART HOME   REMOTE CONTROLS   SMART WATCHES   IOT ENDPOINTS