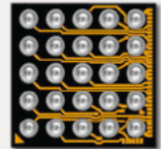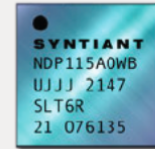# SYNTIANT

NDP115
Neural Decision Processor
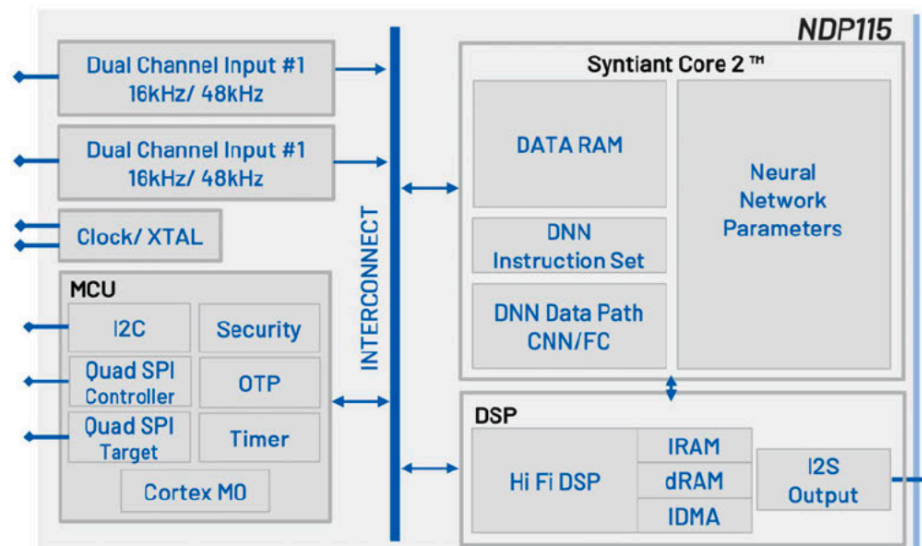### Always-On Speech & Sensor-Fusion Processor

PRODUCT BRIEF

The Syntiant® NDP115 Neural Decision Processor™ is a special purpose chip deep learning and is ideal for always-on applications in battery powered devices and other power constrained systems. The NDP115 applies neural processing to run multiple applications simultaneously with minimal power consumption. Built using the Syntiant Core 2™ programmable deep learning architecture, NDP115 is designed to natively run multiple Deep Neural Networks (DNN) on a variety of architectures, such as CNN, RNN and fully connected networks. NDP115 brings a level of ML performance that delivers 25x the tensor throughput compared to the Syntiant Core 1™ embedded in Syntiant's NDP100 and NDP101 devices, and is able to run speech inferences at a mere 280 microwatts. A programmable HiFi 3 DSP is available for flexible feature extraction classical audio processing.

The NDP115 supports dozens of application-defined audio sequences for a variety of use cases including:

- + Far-field, near-field and close-talk voice interface
- + Multiple wake words and local commands
- + Acoustic Echo Cancellation (AEC), noise suppression, beamforming

- + Speech enhancement
- + Speaker identification and verification
- + Acoustic event and scene classification
- + Multi-sensor fusion

BLOCK DIAGRAM

KEY FEATURES & BENEFITS

+ Syntiant Core 2™ neural processor

+ Support for concurrent neural networks, including multi-sensor fusion

+ Embedded user programmable HiFi-3 DSP with 144KB 64 bit data RAM and 64KB 64 bit instruction RAM

+ Deeply embedded Arm Cortex M0 microcontroller for device management with 48KB SRAM, dual- timers, and UART functionality

+ Direct input of PCM audio and support for up to 5 audio streams

+ I2C controller and target modes for sensor control and integration

+ Up to 13 GPIO pins

+ Flexible clock generation

+ Onboard firmware decryption and authentication

+ 25-ball WLBGA package (0.4mm pitch)

APPLICATIONS

The NDP115 enables speech and sensor interfaces in the smallest systems and supports entirely new form factors and always-on detection usage models.

MOBILE PHONES **SMART HOME APPLICATIONS** **HEARABLES/ WEARABLES** **PC** **IOT ENDPOINTS** **AR/VR**