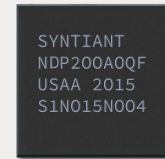


# NDP200

## Neural Decision Processor™

Always-On Vision Sensor & Speech Processor



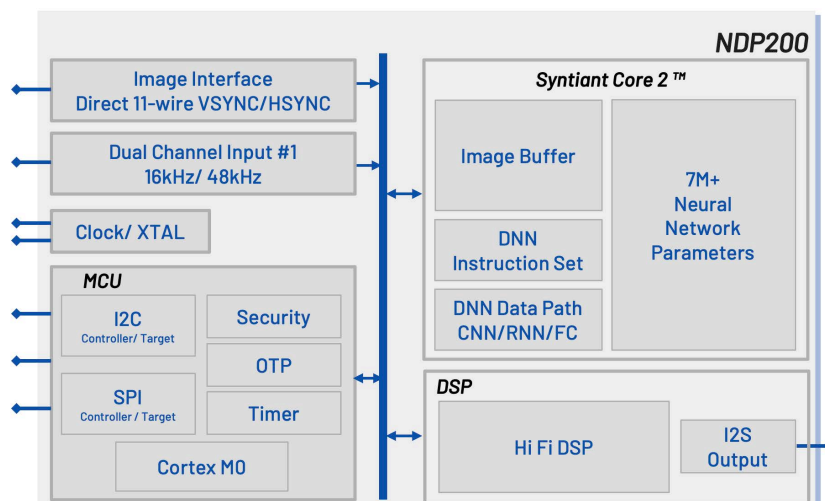
### PRODUCT BRIEF

The Syntiant® NDP200™ is a special-purpose processor for deep learning and is ideal for always-on applications in battery-powered devices. The NDP200 applies neural processing to run multiple applications simultaneously with minimal battery power consumption. Built using the Syntiant Core 2™ programmable deep learning architecture, NDP200 is designed to natively run deep neural networks (DNN) on a variety of architectures, such as CNN, RNN, and fully connected networks, and it performs vision processing with highly accurate inference at under 1mW. NDP200 brings a level of ML performance that delivers 25x the tensor throughput than the Syntiant Core 1™ found in the Syntiant NDP100™ that are currently shipping in high volume. A programmable Tensilica Hifi3 DSP is also added for feature extraction and signal processing.

**NDP200's programmable deep learning network supports dozens of application-defined imaging, speech and sensor sequences for a variety of use cases including:**

- + Person presence detection
- + Object classification
- + Wake words and local commands
- + Motion tracking
- + Acoustic event and scene classification
- + Multi-sensor fusion

### BLOCK DIAGRAM



## KEY FEATURES & BENEFITS

- + Syntiant Core 2™ Deep Neural Network
- + Neural network supported concurrently: fully-connected, 1D & 2D convolution, Depth wise convolution, Recurrent neural network including LSTM and GRU, average and max pooling
- + Up to 896k neural parameters in 8bit mode, 1.6M parameters in 4bit mode, and 7M+ in 1bit mode
- + 11-wire direct Image Interface
- + Dual PDM digital microphone interface
- + I<sup>2</sup>S serial interface with PCM
- + SPI and I<sup>2</sup>C controller and target for multi-modal sensor fusion
- + 26 GPIO pins
- + Embedded programmable Tensilica HiFi 3 DSP
- + Up to 100MHz internal operating frequency
- + Embedded Arm Cortex-M0 for device management with dual timers and UART functionality
- + Low power PLL for flexible clock input
- + Onboard firmware security and authentication
- + Software Development Kit (SDK) integrates in any software environment
- + Training Development Kit (TDK) to enable the user of standard frameworks such as TensorFlow for customer-programmed applications
- + 40-pin QFN package (0.4mm ball pitch)

## APPLICATIONS

The NDP200 enables ultra-low power vision, sensor and speech interfaces in the battery powered systems and supporting always-on person presence detection and object classification use cases



**MOBILE PHONES**



**SMART HOME APPLICATIONS**



**SECURITY CAMERAS**



**VIDEO DOORBELLS**



**SMART DISPLAYS**