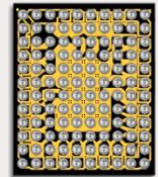
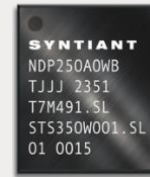


NDP250

Neural Decision Processor

Always-On Vision, Audio & ASR Processor



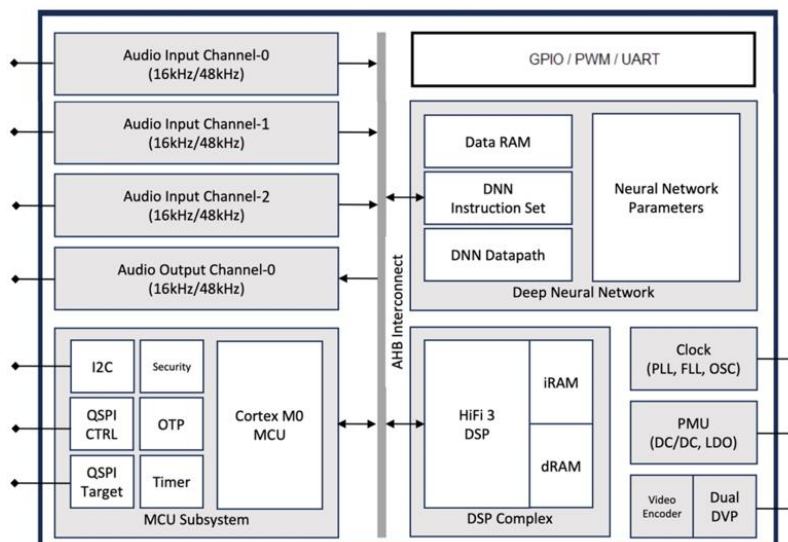
PRODUCT BRIEF

The Syntiant® NDP250 Neural Decision Processor™ is a special-purpose chip for edge-AI processing in battery powered devices and other power constrained systems. Target applications include vision, audio, Automatic Speech Recognition (ASR), and Text-To-Speech (TTS) processing. Built using the Syntiant Core 3™ programmable deep learning architecture, NDP250 is designed to natively run multiple Deep Neural Networks (DNN) on a variety of architectures. The NDP250 delivers a 5x increase in ML performance compared to the previous Syntiant Core 2™ NDP120 and NDP200 devices. A programmable HiFi3 DSP is available for feature extraction and signal processing. The integrated power management (PMU) allows single power rail operation. Combined with the integrated PLL this provides further systems cost reduction opportunities.

The NDP250 supports dozens of application-defined imaging, speech, audio, and sensor behaviors for a variety of use cases including:

- + Person presence detection with pre-roll
- + Object classification
- + On-device ASR
- + Motion tracking
- + Acoustic event and scene classification
- + Multi-microphone full duplex voice communication
- + Multi-sensor fusion

BLOCK DIAGRAM



KEY FEATURES & BENEFITS

- + Broad support of concurrent neural network: fully connected, 1D, 2D & Depth-wise convolution, average and max pooling, recurrent including LSTM and GRU, attention and many other layers
- + Up to 6M neural parameters in 8-bit mode
- + 2 x 11-wire direct image (DVP) interfaces
- + 3 x Stereo PDM digital microphone/I2S/TDM input interfaces
- + 1 x I2S/TDM PCM output interface
- + 1 x Quad-SPI and 2 x I2C controller and target for multi-modal sensor fusion
- + 1 x UART and 2 x PWM interfaces
- + 1 x 5-wire JTAG debug interface
- + 58 GPIO pins
- + Programmable HiFi 3 DSP with 1.5MB of SRAM and Syntiant custom instructions
- + Embedded Arm Cortex-M0 with 512KB of SRAM
- + Up to 120MHz internal operating frequency
- + Input holding tanks to support pre-roll with up to 10 seconds of 550x700 compressed Motion-JPEG image recording at 5 FPS
- + Low power PLL for flexible clock input
- + Integrated low power oscillators for reference clock
- + 1.8/3.3V supply with embedded Power Management Unit (PMU)
- + 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
- + 6.1mm x 5.1mm 120-ball eWLB package (0.5mm pitch)

APPLICATIONS

The NDP250 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

CORPORATE HEADQUARTERS

7555 Irvine Center Drive, Suite 200, Irvine, CA 92618

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