

NDP120/115

Neural Noise Suppression

Low Power, High Quality Speech Enhancement



PRODUCT BRIEF

The Syntiant® NDP120 and NDP115 Neural Decision Processor™ are optimized for high performance, cost-effective neural network (AI) processing of audio and sensor inputs for battery powered devices and other space and power constrained systems. Classical single channel noise suppression algorithms only suppress stationary noise. However, single channel AI noise suppression offers the promise to suppress wind noise and other non-stationary noises such as babble noise, construction site noise, etc. AI noise suppression also offers the promise to suppress background noise to a far greater extent without the associated typical speech distortion. The promise of AI noise suppression is fulfilled at low power with the family of mh acoustics® DWF-ML AI noise suppression neural networks running on the Syntiant Core 2™ of NDP120 and NDP115.

PERFORMANCE

The table below compares the DWF-ML AI noise suppression on NDP120 and NDP115 to widely cited baseline neural networks in the Deep Noise Suppression (DNS) Challenges of the scientific community. The 2020 DNS Challenge provides a common test set of clean and wideband noise speech files for comparing noise suppression performance. The set contains 12 different noise categories at SNR levels between 0dB and 25dB. Most commonly, a single lumped score across the entire test set is used.

For 3 DWF-ML sized implementations on NDP120 and NDP115 and reference networks from DNS1 (2020) and DNS3 (2021), the table lists the size (number of parameters), ITU-T P.862.2 Corrigendum 1 (WB-PESQ) scores achieved on the DNS1 test set, delay, NDP implementation, and power consumption. As an additional performance reference, a very large network (FCRN/PESQNet) is also included.

Method	Size	WB-PESQ	Delay	NDP120	NDP115	Power
Noisy microphone		2.23				
DNS1 reference	1.26M	2.65	8ms			
DNS3 reference	2.8M	3.15	16ms			
FCRN/PESQNet	5.2M	3.47	32ms			
DWF-ML small	141K	3.35	16ms	✓	✓	0.7mW
DWF-ML medium	296K	3.42	16ms	✓	✓	0.8mW
DWF-ML large	589K	3.50	16ms	✓		1.0mW

KEY FEATURES & BENEFITS

- + Suppression of wind noise and non-stationary noises
- + Exceeds quality of references in recent DNS Challenges according to ITU-T P.862.2
- + Ready-to-go neural networks in different sizes targeting typical wideband speech enhancement applications
- + Ability to support custom neural networks targeting specific interfering sources and/or desired sources
- + Less than 1mW, high quality, AI noise suppression and speech enhancement on NDP120 and NDP115
- + Tradeoffs available in network size supporting other concurrent neural networks on NDP120 and NDP115
- + Audio input: PDM microphone, I2S, SPI
- + Audio output: I2S, SPI
- + Audio format: 16-bit, 16kHz default, other sampling rates upon request

APPLICATIONS

The NDP120 and NDP115 enable high quality AI speech enhancement and noise suppression in the smallest and lowest power systems:



MOBILE PHONES



SMART HOME APPLICATIONS



HEARABLES/WEARABLES



PC



IOT ENDPOINTS



MEDIA STREAMERS



AR/VR



AUTOMOTIVE