Next generation MEMS microphones are integrating AI for Voice, Keyword and Speech-to-Intent commands. By using all analog AI from Blumind, they can achieve this additional functionality in a cost-effective solution, while reducing power by >90% in always on audio applications.

Always-on AI for (Smart) MEMS Microphones

A voice-based user interface (UI) is becoming a must have feature in portable and wearable electronics. The challenge for product designers is that the power required by always-on digital microphones and digital AI inferencing algorithms severely limits system battery life, resulting in the feature being removed or downgraded to a push-to-talk capability. Next generation MEMS microphones are deploying ultra-low power AI neural networks to replace the current digital ASIC in the microphone package enabling always-on AI audio processing at a fraction of the power of current microphones. Key to adding this additional functionality and reducing power is the use of an all-analog signal processing path and analog AI neural network for the inferencing. The Analog AI core enables the digital (audio) data output from the MEMS package and interrupts the system MCU, only when interesting audio is observed. However, on demand, the system MCU can access digital audio output if required. By processing the audio with an all-analog AI signal path up to 95% of the always-on power can be saved between the highly efficient analog AI compute core and disabling digital data output until something interesting has been detected.

Lowest Power with Programmability

Blumind all-analog approach to smart MEMS AI, achieves the highest total system value for clients. System level power, size, and cost are minimized to achieve the most efficient solution. Further, our unique architecture enables in-field updates to neural network parameters critical as new algorithms develop in this fast-moving market area.

Blumind offers high integration ASSP devices and Chiplet/IP solutions. Contact us to learn more about all-analog AI for MEMS microphones.

Blumind AMPL™ Technology

Blumind's AMPL technology is unique. The Blumind all-analog approach delivers the lowest power solution while the inherently parallel architecture delivers ultra-low latency for real time applications, all in a tiny footprint.

No high-speed clocks, ADCs, DACs, or specialty memory are used. AMPL technology is built in standard CMOS with a roadmap to advanced process node.

By exploiting advanced CMOS device physics Blumind creates single transistor neurons that are small and power efficient.

The AMPL architecture was built from the ground up to address the analog compute challenges of variations in process, temperature, voltage, and long-term drift and our results are impressive.

Standard PyTorch and TensorFlow software tools are used to create the parameters for the powerful AMPL neural network.