BLUMIND

AI for Everyone, Everywhere

Application Brief

Always on AI: TWS Headphones

Always-on Key Word Detection, Environment Classification and Voice UI for True Wireless Stereo Headphones

Adding trigger key word detection (KWD), simple commands (like volume up/down, next, skip, shuffle) and detecting and classifying the ambient environment for dynamic noise cancelling in ear pods are all high value-added features. However, adding these features in space constrained and power limited true wireless stereo headphones presents a significant engineering challenge. Ultra-low power, small size and low latency are required in a cost-effective solution; all analog AI compute from Blumind is an ideal solution. Blumind is the leader in all analog edge AI with its AMPL™ technology (see side bar).

Integrated solution

Blumind takes a holistic approach to achieve the highest total system value for clients. We consider the system level power, size, and cost targets to achieve the most efficient solution. For TWS headphones our all-analog approach reduces system power down to ~10% that of our nearest competitors, Blumind's <20µW includes the analog microphone and an integrated 2-second audio buffer. Our tiny ~2mm^2 end-to-end analog approach saves area and cost at the *system level*, allowing clients to differentiate their products. All our products use standard PyTorch or TensorFlow software tool flows with a simple remapping of the results to our all-analog architecture. Contact us to find our more.

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 advance CMOS with a roadmap to leading edge process nodes.

By exploiting advanced CMOS device physics Blumind create 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.