



## **Cell Phone Audio Amplifier**

CogniPower has developed and patented radical technology aimed primarily at improving power supplies. A side benefit of this new technology is the ability to make fundamentally different audio amplifiers which are more efficient and sound better than conventional amplifiers. The improved efficiency is particularly valuable for any audio device that runs on batteries, because it extends battery life.

Cell phones and tablet computers are known for crisp displays and horrible sound. Our audio amplifiers can greatly improve both their efficiency and fidelity. The experience of watching a movie on a tablet computer could be vastly better with good sound and longer battery life. Furthermore, in noisy environments, like airplane cabins, sound energy can be harvested to recharge the battery.

How is it possible? In a conventional audio amplifier, all the energy moves from the power supply to the speaker. We draw some of the energy back from the speaker and reuse it, instead of dissipating it as wasted heat. Two distinct new technologies are necessary to make that approach practical, which is why it has not been done before. CogniPower holds fundamental, issued patents on both those technologies. A predictive, bidirectional power converter drives the speaker directly, eliminating the size and cost of extra power supplies. This bidirectional amplifier approach actually makes a given speaker sound better, and enables the design of even more efficient speakers.

High fidelity speakers require enclosures which must damp resonances to avoid peaks and valleys in the sound at different frequencies. The CogniPower audio amplifier removes those peaks and valleys actively, by recovering energy. The conventional, passive damping methods that waste power become unnecessary. Also, ceramic or electrostatic speakers are more efficient, but are hard to drive using conventional amplifiers. The CogniPower amplifier can recover even more energy from these types of speakers, for further efficiency improvements. Battery drain can be reduced by a factor of five to ten compared to conventional efficient amplifiers..

These improvements are achieved via a rearrangement of the same circuit elements now employed in conventional efficient audio amplifiers, with the addition of a novel means of control. Since changing the control intelligence does not add to the cost of an integrated circuit, these benefits can be realized without an increase in cost. System costs can be reduced because less waste heat needs to be removed, and a smaller battery can perform the same job.

The same technology can be scaled for hearing aids, or consumer electronics, all the way up to theater-sized systems.