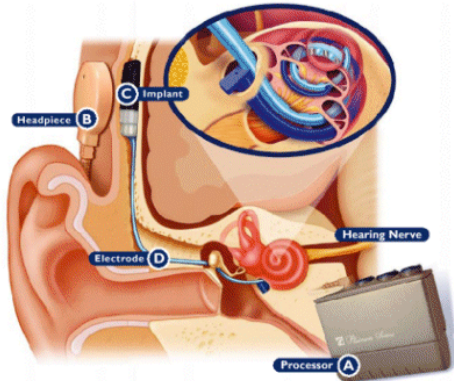


An Ultra-Low-Power programmable analog bionic ear processor

-By Louis Chen

What your inner ear does:

- With regular conversation, your inner ear will be carrying out at least what is equivalent of a billion floating point operators each second, something a typical XBOX computes
- With that, your ear can pick up sounds with a frequency range of 20-20,000 Hz and distinguish sound intensities of up to 120dB
- Not only that, it can distinguish and isolate a conversation in a room filled with noise
- Your XBOX Uses close to 50 Watts while your inner ear does all this with a mere 14mW.
- With just one single AA Battery, it could be powered for 15 years
- Analog Vs Digital And the differences



Traditional Hearing Aids

- Hearing aids have improved dramatically
- However, modern hearing aids called Cochlear implant now consist of electrode arrays, power-hungry digital signal processor (worn outside) and then sends signals to the electrodes.
- Battery and entire processing unit is bulky and consumes a lot of energy.
- **Solution?**
- Improve Processing design and minimize size.

An Ultra-Low-Power Programmable Analog Bionic Ear Processor

This new design consists of several advantages and features

- Uses a processor with 1.5- μ m BiCMOS technology consuming only 211 μ W
- The 9.58mm x 9.23mm processor chip runs on 2.8V and consumes less power than the state-of-the-art A/D to DSP design by a factor of 25 which is small enough to be implantable
- To be mated with 100mAh rechargeable battery
- Offers 76dB overall dynamic range

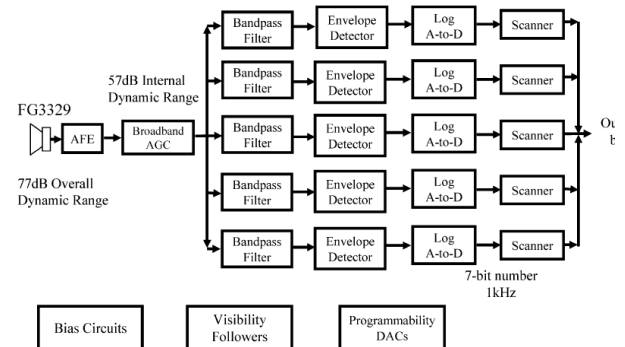


Fig. 1. Overall architecture of the analog BE processor.

Conclusion:

This could be the next generation in cochlear implants. It is discrete and extremely power efficient

Sources:

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