

# Audio Enhancement Package for Hands-Free Devices



## Frequency Domain Acoustic Echo and Noise Control for Blackfin

An Echo and Noise Control algorithm for Analog Devices Blackfin processors is now available from Bayer DSP Solutions. The algorithm has been created for use in noisy environment to obtain clear speech in speaker phones, teleconferencing devices, voice-control systems, open-air intercoms, hands free applications and many more.

The algorithm consist of a full-duplex frequency-domain Acoustic Echo Canceller (AEC) with subsequent Post-Filter designed to cancel acoustic feedback between a loudspeaker and a microphone in hands-free audio systems and simultaneously reduce near-end background noise and residual echo. The size of the AEC and the Post-Filter can be adjusted to system requirements.

The algorithm was implemented to be independent of the hardware interface, i.e. the user specifies input and output channels and must handle buffers in his framework.

The algorithm is fully re-entrant and can easily be integrated in a "C"-environment.

### Features:

- Full-Duplex capability (VDA class 1 type)
- Post-Filter configurable to cover Residual Echo Suppression
- Noise Reduction
- Configurable filter sizes and algorithmic delay
- Configurable noise reduction level
- Configurable residual echo suppression sharpness
- Customizable to specific acoustic echo path variability
- Single Talk Attenuation > 60 dB for time-invariant environments
- Single Talk Attenuation > 45 dB for time-varying environments

### Resources for fs = 8kHz:

- ~ 85 MIPS
- ~ 35 Kbytes Program Memory
- ~ 25 KBytes Data Memory



## Support

- Demo for BF533-EZLite available under NDA
- Fully documented library
- Customization/Integration support available
- Code portable to other platforms

## Ingenieurbüro Bayer DSP Solutions

Ingenieurbüro Bayer DSP Solutions was founded in 1995 by Andreas R. Bayer, a first hour DSP specialist.

We support a variety of DSP and FPGA chips from Analog Devices, Texas Instruments, Xilinx, Altera and other renowned silicon vendors.

Our goal is to provide comprehensive coverage of all Digital Signal Processing topics, including hardware design, FPGA design, DSP algorithms, software integration, tools and complete products.

Ingenieurbüro Bayer DSP Solutions is a registered and active Third Party of Analog Devices, Texas Instruments and other silicon vendors.

We closely co-operate with the before mentioned partners so as to provide the best support in every phase of your project. Besides "home-grown" DSP hardware and algorithms, we offer Blackhawk JTAG-Emulators for debugging of Texas Instruments DSP and Sundance DSP/FPGA-Boards for high performance applications such as software-defined radio.

For more information, please call us or go to our website.



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