AS3500 AS3501 AS3502

Preliminary Product Brief

Low Power Ambient Noise-Cancelling Speaker Driver

General Description

The AS3500/01/02 are speaker driver with Ambient Noise Cancelling function for handsets, headphones or ear pieces. It is intended to improve quality of e.g. music listening, a phone conversation etc. by reducing background ambient noise.

The fully analog implementation allows the lowest power consumption, lowest system BOM cost and most natural received voice enhancement otherwise difficult to achieve with DSP implementations. The device is designed to be easily applied to existing architectures.

An internal OTP-ROM can be optionally used to store the microphones gain calibration settings.

The AS3500/01/02 can be used in different configurations for best tradeoffs of noise cancellation, required filtering functions and mechanical designs.

The simpler feed-forward topology is used to effectively reduce low frequency background noise. The feed-back topology with either 1 or 2 filtering stages can be used to reduce noise for a larger frequency range, and to even implement transfer functions like speaker equalization, Baxandall equalization, high/low shelving filter and to set a predefined loop bandwidth.

The filter loop is optimized by the user for specific handset electrical and mechanical designs by dimensioning simple R, C components.

Most handset implementations will make use of a single noise detecting microphone. Two microphones could be used to allow for increased flexibility of their location in the handset mechanical design. Using the bridged mode allows to even drive high impedance headsets.

Key Features

Microphone Input

- 128 gain steps @0.375dB and MUTE with AGC
- differential, low noise microphone amplifier
- single ended or differential mode
- supply for electret microphone
- MIC gain OTP programmable

High Efficiency Headphone Amplifier

- 2x34mW, 0.1% THD @ 16Ω, 1.5V supply 100dB SNR
- bridged mode for e.g. 300Ω loads
- click and pop less start-up and mode switching

Line Input

- volume control via serial interface or volume pin
- 64 steps @ 0.75dB and MUTE, pop-free gain setting
- single ended stereo or mono differential mode

ANC processing

- feed-forward cancellation
- feed-back cancellation with filter loop transfer function definable via simple RC components
- simple in production SW calibration
- 12-30dB noise reduction (headset dependent)
- 10-2000Hz wide frequency active noise attenuation (headset dependent)

Monitor Function

- for assisted hearing, i.e. to monitor announcements
- fixed (OTP prog.) ambient sound amplification to compensate headphone passive attenuation
- volume controlled ambient sound amplification mixed with fixed (OTP prog.) attenuation of LineIn

Incremental Functions

- ANC with or without music on the receiving path
- improved dynamic range palyback
- simple and low cost single noise detection microphone implementation
- OTP ROM for automatic trimming during production

Performance Parameter

- 5/3.8mA @ 1.5V stereo/mono ANC; <1uA quiescent
- extended PSRR for 217Hz

Interfaces

- 2 wire serial control mode & volume inputs
- calibration via Line-In or 2-wire serial interface
- single cell or fixed 1.0-1.8V supply with internal CP

Package

- AS3500, AS3501 QFN24 [4x4] 0.5mm pitch
- AS3502 QFN32 [5.x5] 0.5mm pitch

Applications

Earpieces, Headsets, Hands-Free Kits, Mobile Phones, Voice Communication Devices

Figure 1. AS3501 Feed Forward ANC Block Diagram

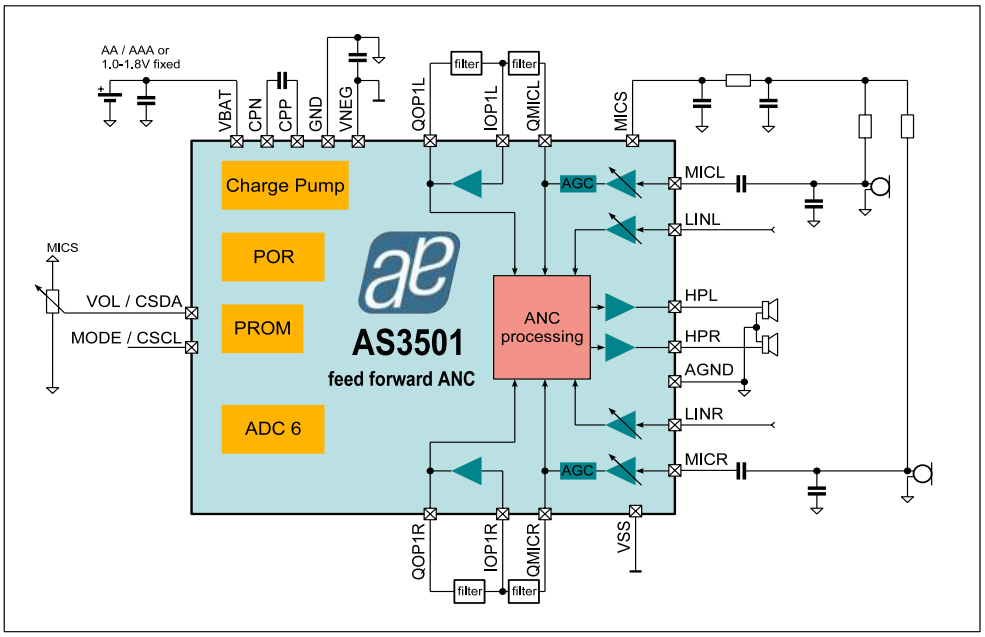
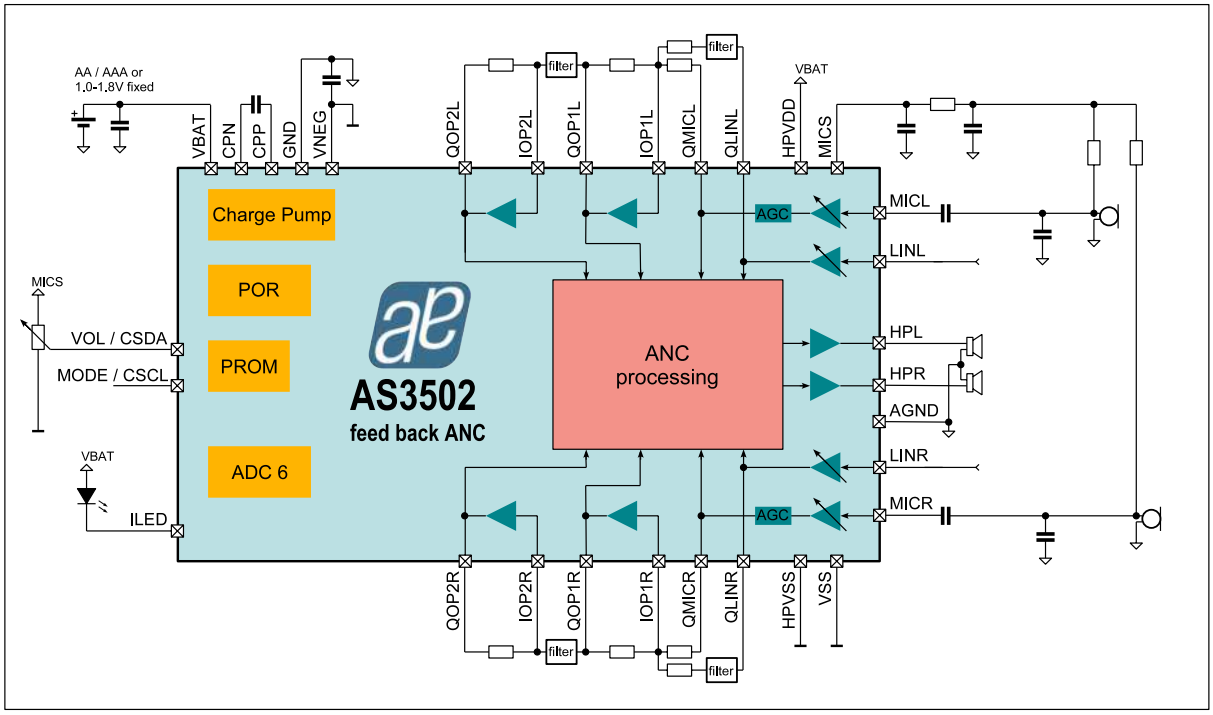


Figure 2. AS3502 Feed-Back Block Diagram



Copyrights

Copyright © 1997-2009, austriamicrosystems AG, Schloss Premstaetten, 8141 Unterpremstaetten, Austria-Europe. Trademarks Registered ®. All rights reserved. The material herein may not be reproduced, adapted, merged, translated, stored, or used without the prior written consent of the copyright owner.

All products and companies mentioned are trademarks or registered trademarks of their respective companies.

Disclaimer

Devices sold by austriamicrosystems AG are covered by the warranty and patent indemnification provisions appearing in its Term of Sale. austriamicrosystems AG makes no warranty, express, statutory, implied, or by description regarding the information set forth herein or regarding the freedom of the described devices from patent infringement. austriamicrosystems AG reserves the right to change specifications and prices at any time and without notice. Therefore, prior to designing this product into a system, it is necessary to check with austriamicrosystems AG for current information. This product is intended for use in normal commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional processing by austriamicrosystems AG for each application. For shipments of less than 100 parts the manufacturing flow might show deviations from the standard production flow, such as test flow or test location.

The information furnished here by austriamicrosystems AG is believed to be correct and accurate. However, austriamicrosystems AG shall not be liable to recipient or any third party for any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interruption of business or indirect, special, incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of the technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of austriamicrosystems AG rendering of technical or other services.

Contact Information

Headquarters
austriamicrosystems AG
A-8141 Schloss Premstaetten, Austria

Tel: +43 (0) 3136 500 0
Fax: +43 (0) 3136 525 01

For Sales Offices, Distributors and Representatives, please visit:

http://www.austriamicrosystems.com/contact