Mobile Phones · **Headsets** · **UMPCs** · **Computers** · **Car Systems**

About QVoice™

QVoice is a unique, feature-rich noise reduction and echo cancellation software solution for mobile phones, hands-free car phone systems and headsets. Offering exceptional natural-sounding speech clarity in noisy environments, **QVoice** high-performance algorithms deliver the most effective, efficient, leading quality voice solution available on the market today.

QVoice includes adaptive algorithms with fast convergence for bi-directional noise reduction, acoustic echo cancellation and noise-dependent automatic volume control. Designed for single and dual* microphone input and highly optimized for low resource consumption with a small memory footprint, it provides a tunable solution for a variety of devices.

QVoice proprietary technology identifies background noise mixed with signal and intelligently auto-tunes the noise reduction algorithm to cancel different noise types mixed with the signal, including: road/traffic/engine noise, environmental/background music/babble noise and wind noise. Subsequently the speech enhancement algorithm compensates for any adverse effects, resulting in clear natural-sounding speech, even when background noise is dominant.

QVoice can be bundled with QSound's **mQFX** 3D stereo enhancement effects suite, offering OEMs a complete voice and music enhancement package, all from a single vendor. With over 20 years proven expertise in digital audio processing, QSound Labs is the only software developer able to provide a full range of voice and audio solutions.

* Calibration required with customer device

Product Suite

The **QVoice** suite of voice enhancement technology consists of:

- TX / RX noise reduction and speech enhancement.
- Acoustic echo cancellation.
- Noise-dependent volume control in RX.
- Hearing exposure monitoring and alert in A2DP / HSP

Optional

- mQFX audio effects for enhanced music playback

The QVoice Competitive Edge

- *Industry leading sound quality*
- *Advanced DSP-based solution for handsets & headsets*
- *Crystal clear natural-sounding speech with no metallic effects*
- *Unsurpassed performance in hostile, noisy environments*
- *Easy-to-integrate software solution*
- *Low memory & processing footprint*
- *Low development costs & rapid time-to-market delivery*
- *Single-vendor complete voice & audio solution:*
    - *Simplifies integration/licensing*
    - *Saves platform resources*
- *Optimized for CSR BlueCore5-Multimedia family of single-chip ICs*
- *Optimized for ARM 7/9/11 and ARM Cortex+Neon processors*

Feature Set Description

■ **Bi-Directional Noise Reduction**

- excellent performance with all noise types
- simultaneous noise reduction in TX and RX
- up to 20dB noise attenuation
- noise identification for optimal tuning
- fast convergence with low delay
- integrated speech enhancement
- works well when in tandem with a 2nd NR
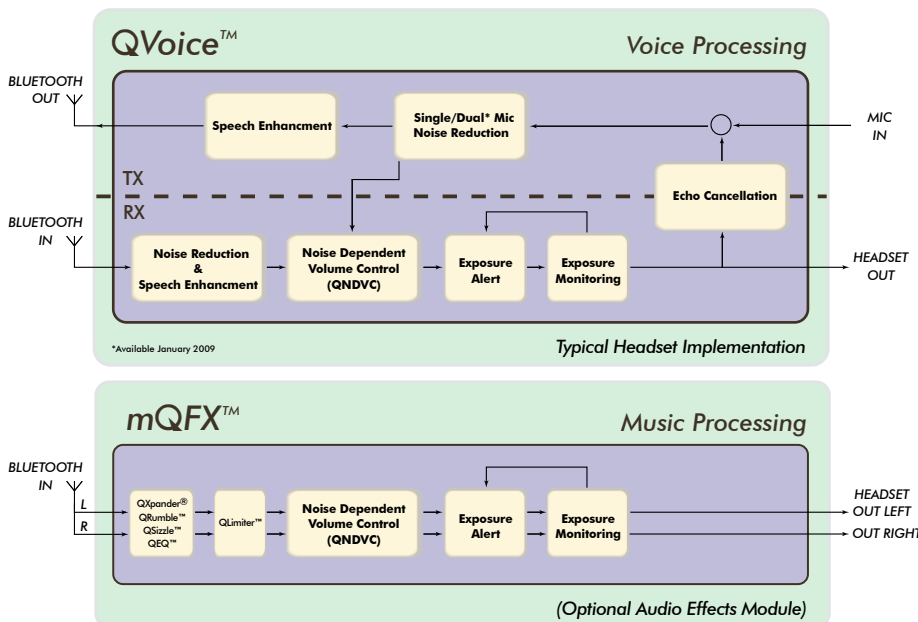
■ **Acoustic Echo Cancellation**

- cancel echos coupled from speaker to mic
- fast convergence & deep echo cancellation
- robust double-talk performance
- processes up to 64msec including echo tail
- handles multiple echos within the frame
- full duplex

■ **Noise-Dependent Auto Volume Control**

- adjusts the volume based on ambient noise
- utilises accurate ambient noise estimation
- smooth and natural transition between levels
- intelligent tracking for optimum voice quality
- avoids startle effects - no sudden changes
- maintains previous signal-to-noise ratio (SNR)
- no need to constantly search for volume buttons

■ **User Exposure Monitoring and Alert**

- continuously monitors acoustic energy through the headset
- calculates accumulative hearing exposure in HSP and A2DP
- configurable loudspeaker setting for precise measurement
- notifies user if pre-defined acoustic energy level is reached
- notification message can be deactivated / reactivated

QVoice™ — Voice Processing

BLUETOOTH OUT — BLUETOOTH IN — Speech Enhancment — Single/Dual* Mic Noise Reduction — Echo Cancellation — MIC IN — TX / RX — Noise Reduction & Speech Enhancement — Noise Dependent Volume Control (QNDVC) — Exposure Alert — Exposure Monitoring — HEADSET OUT

*Available January 2009 — Typical Headset Implementation

mQFX™ — Music Processing

BLUETOOTH IN — L — R — QXpander® QRumble™ QSizzle™ QEQ™ — QLimiter™ — Noise Dependent Volume Control (QNDVC) — Exposure Alert — Exposure Monitoring — HEADSET OUT LEFT — OUT RIGHT

(Optional Audio Effects Module)

Optimization & Integration

Audio solutions by QSound Labs have been rigorously optimized with the participation of our major industry partners focusing on three critical requirements: Quality, Memory Footprint, and Performance.

QSound's comprehensive suite of new voice enhancement technologies are optimised to run on Kalimba DSP and ARM 7/9/11/ Cortex+Neon processors. The Master Headset Application combination of audio and voice solutions from QSound are ideal for module selection and speedy integration to deliver new products with unique features.

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TX and RX Channels -- Before | TX and RX Channels -- After

RX Channel -- Noise-dependent Auto Vol Control

QSoundLabs