



Technology Overview

mQFX™

digital audio enhancement engine

About mQFX™

mQFX, also known as “microQ effects”, increases the audio impact of media players with a powerful set of enhancements that will set your products apart from the crowd.

mQFX is a compact, high-performance software digital audio processing package drawn from QSound Labs’ ground-breaking **microQ™** digital audio engine. mQFX shares with microQ inherent modularity, scalability and portability. You can easily choose the functions that suit your exact product application.

Product Suite

The mQFX suite enhances the music listening experience with:

QSound Spatial Enhancements

- **QXpander®** 3D stereo sound stage expansion.
- **QVerb™** digital reverberation.

QSound Spectral Enhancements

- **QEQualizer™** parametric spectrum control with presets.
- **QSizzle™** dynamic high-frequency enhancement.
- **QRumble™** dynamic low-frequency enhancement.

QSound Dynamix Controllers

- **QAutoLeveler™** automatic gain control.
- **QXtremeVolume™** handset speaker volume maximizer.
- NEW!** • **QNDVC™** noise dependent volume control.
- **QDRC™** dynamic range control.
- **QLimiter™** anti-saturation dynamic range control.

Feature Set Description

QXpander® -- Proprietary **QXpander** 3D spatial processing literally adds new dimension to music playback, expanding the sound stage beyond the physical limitations of speaker locations, and expanding the acoustic image outside the listener’s head when listening with headphones. This results in a more natural and less fatiguing listening experience.

QXpander employs purpose specific algorithms for maximum spatial impact on headphones or speakers. Speaker targeted 3D processing is optimized for narrow speaker geometries and can be OEM-tuned for peak performance on front, rear, and side-firing speaker configurations.



Mobile Phones



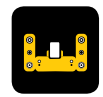
Music Players



Earphones



UMPCs



Docking Stations



The mQFX Competitive Edge

- Industry leading, ARM® optimised
- Proven track record and established brand recognition
- Single-vendor full audio solution:
 - Simplifies integration
 - Saves platform resources
- Selectable, scalable modular components for easy implementation
- Small memory footprint
- High efficiency processing
- Supports earphones and speakers
- Tunable 3D for all narrow geometry speaker configurations

Feature Set Description continued

QSizzle™ -- An adaptive mid to high-frequency spectral enhancement, QSizzle restores a natural-sounding sonic punch to compressed formats by selectively adding upper spectrum energy according to input signal characteristics.

QRumble™ -- The low-frequency counterpart to QSizzle, QRumble also adds energy in a selective fashion, bringing substance and warmth to the low end spectrum without overloading on loud passages.

QEQualizer™ -- A sophisticated, highly flexible, fully parametric tone control. Configurable number of stages, with variable filter type, bandwidth, frequency, and fully-symmetrical +/- 18dB gain for each stage. Large library of customizable presets available.

QXtremeVolume™ -- Maximizes handset speaker output for increased audibility in noisy environments, yet minimizes potentially speaker-damaging signal distortion.

QAutoLeveler™ -- Simple, foolproof, adjustable automatic gain control. Applies a dynamically-variable boost to quiet passages/sources, producing greater playback consistency, increased average signal level, reduced need for level readjustment and improved audibility of soft passages over ambient noise.

QNDVC™ -- Noise dependent volume control adapts dynamically to ambient noise in the listening environment to ensure maximum audibility.

QDRC™ -- Similar in function to QAutoLeveler, QDRC provides non-linear gain management with complete parametric control for expert users.

QLimiter™ -- A high-efficiency, anti-saturation dynamic range controller, QLimiter handles any combination of signals and extreme effects settings, eliminating output distortion with high transparency and low overhead.

QVerb™ -- 3D acoustic environment simulation enables users to place their music in the sonic context of choice, with presets for stadium, concert hall, club and more.

Platforms & Implementations

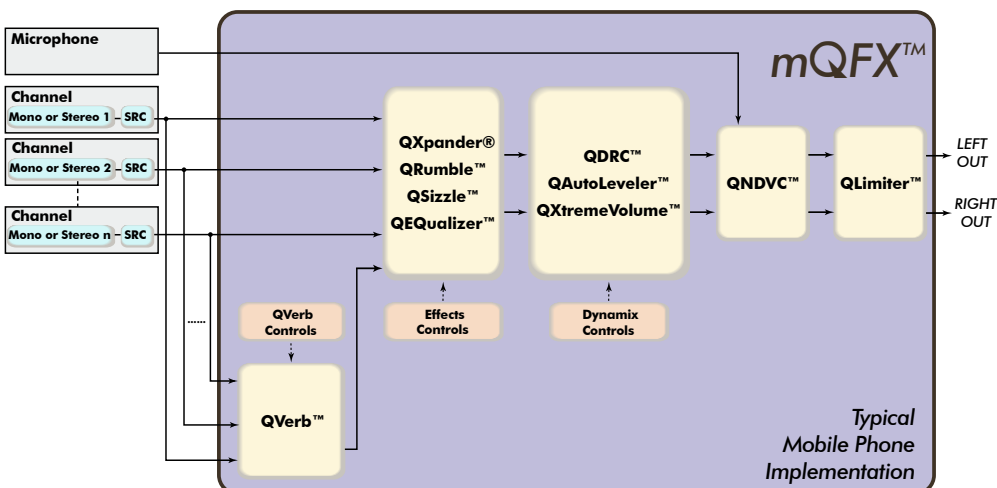
mQFX is written and available in highly optimized C or C++ using fixed-point math and features the unique combination of small footprint and high efficiency that is the hallmark of QSound audio platforms.

Modular, scalable components make **mQFX** easily adaptable to any target environment, with the requirement for platform-specific code reduced to input and output interfaces.

mQFX can be provided in the form of object code, or custom ported by QSound Labs to suit your specifications and can be implemented at various system levels, e.g. within a driver, as a plug-in or as a user application.

mQFX is currently available for DSP and RISC architectures, including ARM® and enhanced ARM architectures running Linux, Symbian OS®, Nokia® Series 60 and Microsoft® Windows Mobile.

- ARM7™/ARM9/ARM11/ARM Cortex+ARM Neon
- CEVA® Teak™ / TeakLite™ DSP cores
- Qualcomm® MSM 6xxx / MSM 7xxx
- Marvell® PXA300 / PXA310
- AMD® Imageon™
- Tensilica® Xtensa®
- Infineon® MP-E
- TI® OMAP™



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