About microQ® for JSR234

microQ is a compact, modular and highly efficient software digital audio engine enabling polyphonic ringtones, 3D game sound, and enhanced music playback with multiple effects for mobile devices.

Java Specification Request JSR234 was established to introduce enablers and controls for advanced multimedia features and capabilities. **microQ** for JSR234 is a fully compatible native implementation that supports the special audio processing requirements specified in JSR234 for mobile devices.

microQ represents the culmination of over 15 years of PC host and DSP audio software development and product deployment by QSound Labs, a world leader in sonic innovation.

Product Suite for JSR234

Unmatched by any single vendor, **microQ**'s modular audio suite consists of the following major components:

mQSynth™ Polyphonic Wavetable Synthesizer

For ringtones and background music in interactive applications such as games, mQSynth plays musical scores contained in performance files (MIDI and similar formats) using digital sample-based instruments.

mQ3D™ Positional 3D Audio Engine

mQ3D Positional places multiple sounds independently in 3D space for interactive gaming. Applicable to arbitrary streams or mQSynth synthesizer channels using native or custom instruments and sound effects. Optional: QEM™ environmental modeling (reverberation).

mQFX™ Digital Effects

Enhancing the music listening experience, the mQFX suite includes:

- **QXpander®** 3D stereo sound stage expansion.
- **QVerb™** reverberation.
- **QChorus™** effect of multiple voices singing in unison.
- **QCompressor™** audio compressor.
- **QEqualizer™** static multi-band equalization.
- **QLimiter™** anti-saturation dynamic range control.
- **QLoudness™** Fletcher-Munson equalization loudness curve.
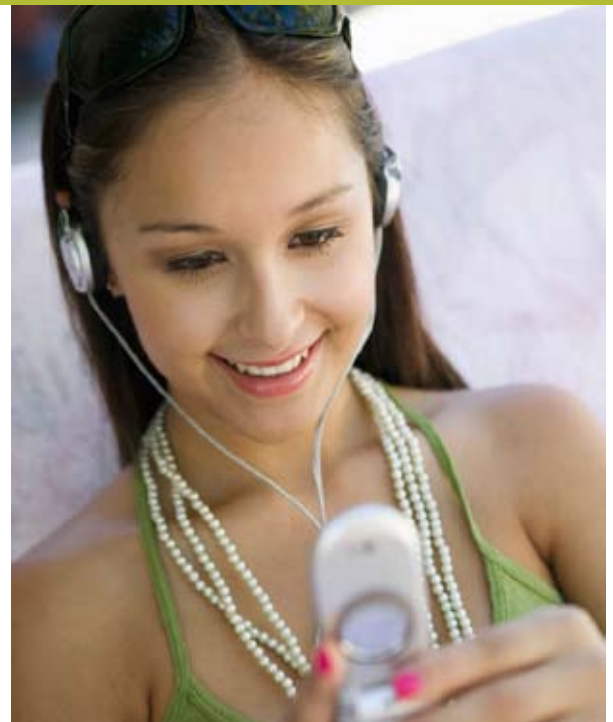
The microQ Competitive Edge

- *Full JSR234 compatibility:*
  - *Mandated & optional requirements*
  - *Effects order control*
  - *Full support for JSR135 synth controls*
- *Proven track record and established brand recognition*
- *Replaces dedicated hardware music synthesizer*
- *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*

Platforms & Implementations

microQ® for JSR234 is written in highly-optimized C++ with a C interface for the audio features of JSR234. The interface is also provided by abstract C++ classes with callable equivalents. These closely follow the Java versions thereby easing the interface with the native Java interface.

microQ features the combination of small footprint and high efficiency that is the hallmark of QSound audio platforms. Modular, scalable components make microQ readily adaptable to any target environment, with the requirement for platform-specific code reduced to input and output interfaces.

microQ is currently available for DSP and RISC architectures running Linux, Symbian OS® 7.0s+, Nokia® Series 60, and Microsoft® Mobile.

- ARM® 7, ARM® 9 (Optimized by ARM®)
- ARM® 9E, ARM® 11 (Optimized by ARM®)
- CEVA-Teak™ & Teak Lite™ DSP cores
- Infineon MP-E
- Qualcomm® MSM 6xxx/MSM 7xxx
- Tensilica® HiFi 2 Audio Engine
- AMD (ATI) Imageon™
- TI® OMAP™

microQ can be implemented at various system levels, e.g. within a driver, as a plug-in, part of the glue layer to a JVM, or as a user application.

microQ can be provided in the form of object code, or custom ported by QSound Labs to suit your specifications.

microQ Compliance with JSR234

Audio Classes Supported by microQ

JSR-234 Interfaces and Classes	microQ JSR234 Support
AudioFormatControl	✔
AudioVirtualizerControl	✔
ChorusControl	✔
CommitControl	✔
DirectivityControl	✔
DistanceAttenuationControl *	✔
DopplerControl	✔
EffectControl	✔
EffectModule	✔
EffectOrderControl	✔
EqualizerControl **	✔
GlobalManager	✔
LocationControl *	✔
MIDIChannelControl	✔
MacroscopicControl	✔
ObstructionControl	✔
OrientationControl *	✔
PanControl	✔
PriorityControl	✔
ReverbControl *	✔
ReverbSourceControl	✔
SoundSource3D	✔
Spectator	✔

* Mandatory for 3D under JSR-234 *** Mandatory for Music under JSR-234*

Support for API's & Standard Formats

microQ renders polyphonic sequenced content (MIDI, SP-MIDI, XMF, mXMF, iMelody, MFi v4.0, SMAF-MA2/MA3/MA5 with LED, Vibration and .SPF Phrases) with its native wavetable synthesizer sample set or by using numerous custom downloadable instruments (DLS, DLS2.0, Mobile DLS).

microQ plays multiple linear and compressed digital audio formats (WAV, PCM, ADPCM, MP3*). *On Marvell parts

microQ API support: JSR-135, JSR-234

Fully Compliant with Java Specification Request (JSR)

microQ is fully compliant with JSR 234 and is TCK approved (Technology Compatibility Kit – the suite of tests used to test compatibility against specific JSRs).

Reference Implementations

microQ has been selected as the reference implementation for JSR 234 for the Sun Java Wireless Toolkit and for the Vodafone VFX platform.

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