

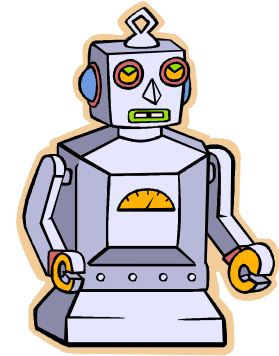
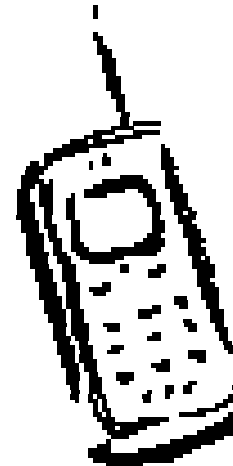
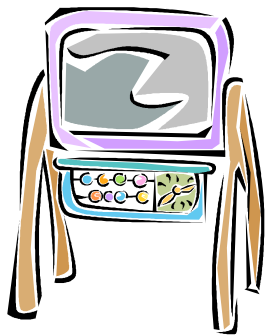


Mobileer ME-Series Product Overview

Audio Engines for the
Mobile Experience

ME-Series – A Quick Look

- High quality, high value, polyphonic ringtone engine for PDAs, mobile phones, smart-phones, toys and more ...



MOBILEER

ME-Series – Functional Blocks

MIDI File Player	Parses & plays standard polyphonic MIDI files.
SP-MIDI Processor	Parses MIDI byte stream, allocates voices.
Hybrid Synthesizer	Generates 16 bit PCM audio stream from processed MIDI commands.
Hybrid GM Sound Library	Defines various instruments, e.g. flute, marimba, by specifying waveforms, envelope parameters, modulation, etc. used by synthesizer.



ME-Series - Key Features

- ✓ Highly portable software product.
- ✓ Designed for handheld devices: mobile phones, PDAs, toys, low cost musical instruments.
- ✓ Plays standard MIDI files (SMF).
- ✓ Supports full General MIDI instrument set.
- ✓ Supports Scalable Polyphonic MIDI (SP-MIDI) standard.
- ✓ Embeds into fixed-point integer 32-bit CPU designs (ARM or MIPS).



ME-Series - Benefits to Manufacturer

- 👍 Higher quality sound with ultra-low memory footprint
- 👍 Combines Mathematical and Wavetable Synthesis
- 👍 Clean design simplifies integration; some clients have integrated in less than an hour
- 👍 Saves development time and cost
- 👍 Configurable from a minimum 14Kbyte orchestra
- 👍 Custom orchestra provided to match customer needs



ME-Series - Benefits to End User

Meet Market Needs

- 👍 Meets requirements for standard polyphonic ringtones.
- 👍 Hybrid synthesis for rich, high quality sounds.
 - 👍 Uses either mathematical or wavetable synthesis, whichever is optimal for type of instrument.
- 👍 ME3000 supports Mobile XMF ringtone standards for custom sounds



ME1000 – Low Memory Footprint

ME1000 is designed to use very little memory.

- 👉 14 KB Data ROM for Instrument definitions & tables.
- 👉 20-30 KB Code ROM, depending on compiler settings.
- 👉 20-30 KB RAM for voices and buffers
- 👉 8 KB Cache or on-chip RAM for time-critical code



ME2000 – Synthesis and Wavetables

ME2000 is designed for flexibility in optimizing sound with a combination of synthesis and wavetables

- 👉 64KB - 100 MB Data ROM for Instrument definitions & tables, depending upon desired sound quality.
- 👉 20-30 KB Code ROM, depending on compiler settings.
- 👉 20-30 KB RAM for voices and buffers
- 👉 8 KB Cache or on-chip RAM for time-critical code



ME3000 – Synthesis, Wavetables and Mobile XMF

ME3000 all the features of the ME2000 plus support for Mobile XMF

- 👉 MXMF is a new ringtone standard that combines Standard MIDI Files (SMF) with custom Downloadable Sound (DLS).
- 👉 Combines General MIDI and custom instruments
- 👉 SongPlayer API auto-detects ringtone type (SMF or MXMF)



Mobile XMF (MXMF) “eXtended Media Format”

Mobile XMF – Next Step in Polyphonic Audio

- Wrapper format for MIDI, Downloadable Sounds (DLS), and WAVE waveform data
- Typically 10-20 KB
- WAV sounds in A-Law, 8 bit or 16 bit
- 2 DAHDSR envelopes, LFO, optional filter
- “Regions” for keyboard and velocity zones
- “Articulations” for settings and controllers
- Minimum of 5 voices, 8000 Hz
- Minimum uncompressed data 7KB (15KB)



Jukebox for Interactive Audio

- Designed for interactive applications, games.
- Game state and events control sound.
- Commands sent to background audio engine.
- Can play MIDI songs in a queue.
- Can schedule MIDI events using timestamps.
- Schedule short melody then walk away.



ME-Series - Performance

ME-Series delivers optimum performance

- Optimized for small embedded 32-bit CPUs.
- 8-16 voice polyphony on ARM7 at 22050 Hz
- 32+ voice polyphony on ARM9 at 22050 Hz
- Sample rate can be adjusted to trade voices for quality.
- Up to 64 voices can be supported



ME-Series - Standards Support

ME-Series supports industry standards for ringtones.

- SMF – Standard MIDI File polyphonic song format
- General MIDI Lite – instruments and commands
- Scaleable-Polyphony – prioritizes voices in a song
- Portable 'C' – for easy integration
- Mobile XMF – combines SMF and Downloadable Sound (DLS)



ME-Series – Sound Quality

Complete set of General MIDI Instruments

- Synthesizer uses multiple oscillators, envelopes, LFO, & a resonant filter to produce realistic sounds.
- Waveform anti-aliasing for smoother synthetic sounds.
- High quality wavetable library includes a Bosendorfer 290 “Emperor” piano.



ME-Series - Integration Support

Mobileer's ME-Series products include:

- Applications to test & demonstrate player features.
- Scripts to create executable binary files.
- Documentation for compiling, using, & interfacing to the player.
- Standard MIDI Files to test & demonstrate features.
- Technical support by phone or email.



ME-Series - OEM Support

- Portable software architecture means products work across operating systems and platforms.
- Aimed squarely at handheld devices, portable and cellular phones, electronic toys and more, in which high fidelity and consistent sound tones are required.
- Mobileer engineers have experience with chip and hardware design.
- Our engineers can be available for technical support both onsite and off depending on your needs.



What Others Say

"We are very pleased with the sound quality, performance and small footprint of the SP-MIDI synthesis software. Mobileer has a great solution for low-powered mobile devices."

**Mitch Allen, Director of Software
Handspring (now Palm)**



M O B I L E E R

Customer Satisfaction

"ME2000 has high quality and performance as a ring tone engine, and it is also easy to be ported to a code as embedded software for telephony products."

Masa Makino, Manager of Network Solutions Engineering

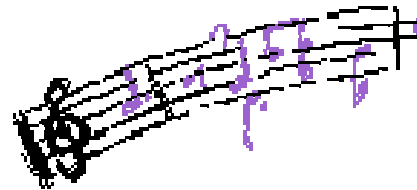
SAXA



Smart Phones



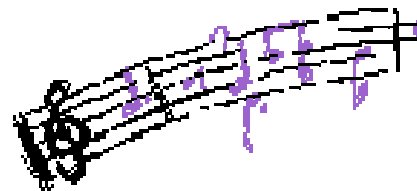
Mobileer's software plays the polyphonic ringtones for Palm's award-winning Treo 600 and 650 Smartphones



Communication Systems



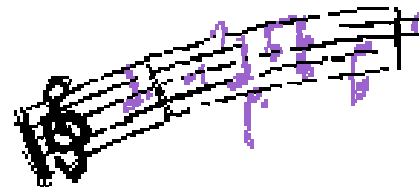
Mobileer's MIDI player provides ringtone and music-on-hold capabilities for Saxa's Actys key telephone system that includes VoIP and router functions



Musical Devices



The ME2000 provides the MIDI file player used to audition songs on the popular Music Pad Pro from FreeHand Systems.



Summary

... Memory saving

... Superior sound

... Lower costs

Mobileer delivers ongoing solutions for your MIDI requirements



Mobileer, Inc. - The Company

- Provider of innovative polyphonic ringtone software and audio engines for embedded handheld devices such as mobile phones, PDAs, toys.
- Privately-held company based in San Rafael, CA.
- Spin-out from audio technology research and incubation organization, SoftSynth.



For More Information

- Visit our website: www.mobileer.com
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Audio Engines for the
Mobile Experience

