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**【 Press Release 】**

**Macronix Announces Two Audio Processors  
for MP3 Mobile Telephones**

Hsinchu, Taiwan, 22<sup>nd</sup> June, 2005. Macronix (MXICY) has announced two new audio processors (A166/A168) that are used in mobile telephones. During the last two years, Macronix has been well recognized as a high-quality 32/64-polyphony sound generator solution provider for mobile phones. To meet the fast-changing audio feature demands in mobile phones and provide more unique audio solutions promptly to system makers, Macronix has developed the Macronix MAP™ (Mobile Audio Platform) core technology concept dedicated to Mobile applications, and these two audio processors (A166/168) are the first ones based on this technology concept.

The A166/A168 are specifically suitable to MP3 cell phones. They are capable of running the MP3 decoder algorithm with very low power consumption. An 8-band Graphic Equalizer is built-in for music mode setting, to play Pop, Jazz, classic, Rock, and others. The A166/A168 devices are able to analyze frequency characteristics of MP3 contents and provide the information in register-base so that the system can use it for LCD graphic display, LED on/off, and vibration in synchronization with music rhythm & beat.



The A166/A168 have a built-in 64-polyphony MIDI engine based on split-wavetable synthesis technology. The wavetable ROM of this MIDI engine is doubled to ensure high-quality audio expression just like real instrumental timbres. Most other MIDI synthesizers used in cell phones, based on either FM-synthesis technology or with small wavetable ROM, actually sound artificial and electrical like toys do.

In addition, the A166/A168 have integrated digital & analog peripherals. In the analog portion of both chips, there are two auxiliary input ports - one is for analog signals from FM radio module, and the other is for speech signals from a baseband processor to offer the hands-free speakerphone feature. Both chips also have Audio ADC and a microphone input port for speech recording. In the digital portion of both chips, there is an IIS interface for audio data streaming. The A168 has integrated USB1.1 and NAND Flash interface to save system loading of MP3 file transmission and storage.

The A166/A168 also have Macronix patented technologies of Rich Audio™. Based on this technology, many speech/audio processing gimmicks, like background sound mixer, answering machine, language-learning, and other similar features can be easily carried out during the implementation of the system.

In order to save development turn-around-time for system makers, Macronix has setup technical service teams in Taiwan and China for prompt technical consulting, trouble-shooting, and MIDI content fine-tuning service. Associated with Macronix regional offices around the world, Macronix commits to no-time-difference customer service for worldwide customers.

Both A166/A168 are in mass production now, and the budgetary prices of both parts are US\$4.2/5.0 based on 1,000 units, respectively. Over 10 cell phone system makers are designing in both parts for their new models to be released during the second half of this year. More system makers, including several famous mobile phone brands, are evaluating these two chips actively. Macronix expects to receive additional positive market response and business returns in the near future based on the rich feature offering on both products.



Aiming at next generation music phones, Macronix is now developing follow on Macronix MAP-enabled audio processors, with more fascinating audio features like audio recording, AAC+, 3D surround, with more peripheral integration, and superior cost/performance benefits. We expect these new products to setup another new benchmark among audio cell phones like the A166/A168 are doing now. This will further reinforce the competitiveness of new models from system makers using these products in the near future.

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## A166/A168 KEY FEATURES

- ◆ Wavetable sound synthesizer based on high-quality wavetable ROM.
- ◆ Simultaneous generation of up to 64 polyphonic tones and fully compliant with General MIDI.
- ◆ Built-in downloadable wavetable by UCS (User Customized Sound) feature to add original instruments and create unlimited timbres.
- ◆ Built-in ADPCM decoder supports 1ch in 32 kHz sampling mode, 2ch in 16 kHz sampling mode and 4 ch in 8 kHz sampling mode.
- ◆ Built-in 4 MIDI ports. Support simultaneous play of 4 MIDI data and 4 ADPCM ch (8 objects maximum).
- ◆ Built-in a four-band parametric equalizer for high-quality MIDI playback.
- ◆ Built-in a 16-band graphic equalizer for MP3 playback.
- ◆ Built-in speaker driver. Its output fully differential swing voltage is 6.2 Vpp with 8 ohm load and typical power is 600mW at 3.6V.
- ◆ Built-in 16-bit resolution audio CODEC.
- ◆ Built-in four sets of PWM control logics for 1 set motor vibration control and 3 sets color LED lighting control.
- ◆ Built-in audio IIS interface for playing the audio source with built-in DAC and power amplifier.
- ◆ Built-in PLL to support master clock input range from 2 to 39 MHz.
- ◆ Provides headphone stereo output. The maximum output fully swing voltage of headphone is 1.6Vpp.
- ◆ Provides software controlled switches for flexible playback to headphone and speaker with various sources.
- ◆ Provides two auxiliary signal (or sound) inputs and a differential voice input.
- ◆ Provides USB1.1 interface (A168 only).
- ◆ Provides NAND flash interface (A168 only).
- ◆ Provides MP3 decoder.
- ◆ Provides AMR codec.
- ◆ Provides Background Sound Mixer™.
- ◆ Provides Polyrhythm Generator™.
- ◆ Provides HE Speech Engine™.
- ◆ Provides Digital Answer Machine feature (A168 only).



- ◆ Provides Digital Voice Recorder feature (A168 only).
- ◆ Support Mass Storage Device U-disk feature (A168 only)
- ◆ 48-pin QFN (A166), 72-pin CSP (A168).