

Mobile Multimedia CODEC with Dual-Mode Class D/AB Speaker Driver

DESCRIPTION

The WM8991 is a highly integrated ultra-low power hi-fi CODEC designed for handsets rich in multimedia features such as GPS, mobile TV, digital audio playback and gaming. Ultra-low power and low noise interfaces to many other audio components in the system are provided.

A powerful 1W speaker driver can operate in class D or AB modes, providing total flexibility to the system designer. Low leakage, high PSRR and pop/click suppression enable direct battery connection for the speaker supply.

A very highly flexible input configuration supports multiple microphone or line inputs (mono or stereo, single-ended or differential).

Four headphone drivers support fully differential headset drive, providing excellent crosstalk performance and bass response, maximising stereo effects, and allowing the removal of large and expensive headphone capacitors.

Stereo 24-bit sigma-delta ADCs and DACs provide hi-fi quality audio record and playback, with a flexible digital audio interface supporting most commonly-used clocking schemes. An integrated low power PLL, an alternative DAC interface and TDM support provide additional flexibility.

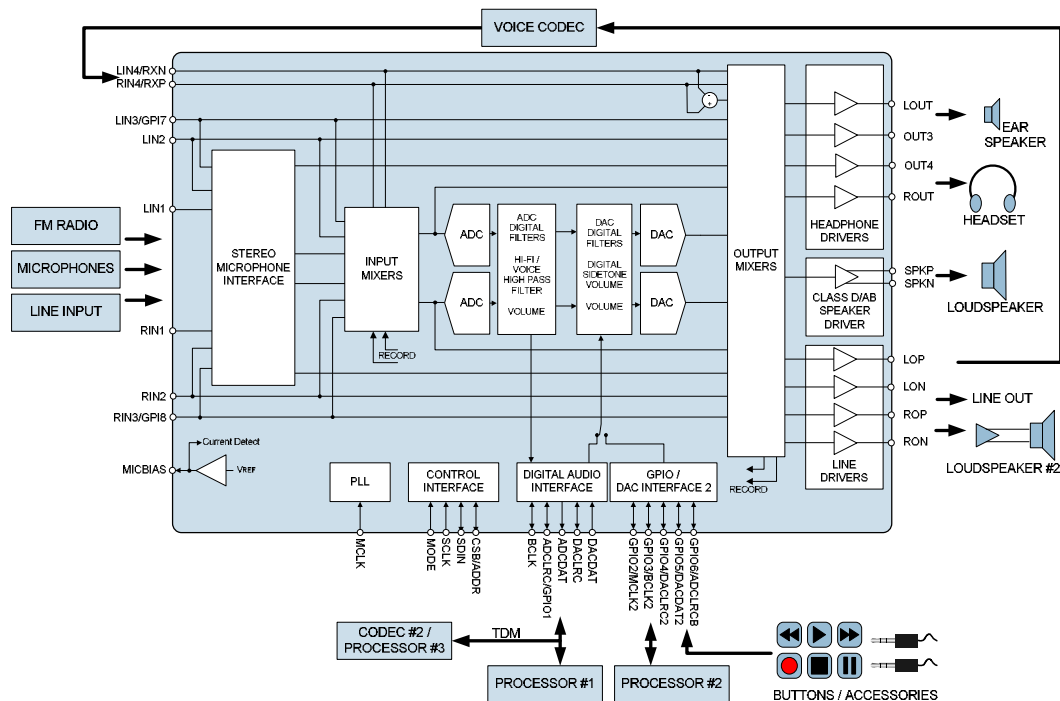
The WM8991 is supplied in very small and thin 5x5mm 65-ball BGA package, ideal for portable systems.

FEATURES

- DAC SNR 99dB ('A' weighted), THD -84dB at 48kHz, 3.3V
- ADC SNR 94dB ('A' weighted), THD -82dB at 48kHz, 3.3V
- Microphone interface (Up to four differential microphones)
- 1W Speaker driver
 - 1W into 8Ω BTL speaker at <0.1% THD
 - 80dB PSRR @217Hz
 - <1uA leakage with direct battery connection
 - Software-selectable class D or AB mode
 - Filterless connection supported
- Headphone / ear speaker drivers
 - 40mW output power into 16Ω at 3.3V
 - Fully differential and capless modes supported
- 4 Mono or stereo differential line outputs
- Pop-free outputs
- Powerful GPIO functions
 - 5mW voice call
 - 13mW DAC playback to headphones
- On-chip PLL provides flexible clocking scheme
- Sample rates: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, 48 kHz
- 65-ball 5x5mm BGA package

APPLICATIONS

- Multimedia phones
- GPS



WM8991 BENEFITS

- **Many new usage scenarios supported**
 - Simultaneous voice call and digital TV reception
 - Stereo hi-fi record of input or output mixers
 - Mixed ADC and DAC sample rates
- **Ultra-low power interface to voice codec**
 - Direct connection from received voice input to headphone output for lowest possible power consumption
 - Microphone amplifier output to voice codec via differential line out
 - 4mW total power consumption during voice call
- **Audio enhancement**
 - Hi-fi quality ADCs and DACs with low power consumption
 - 300Hz Voice mode for ADC high pass filter suppresses wind noise and mechanical vibration
 - Digital sidetone for bio-feedback with reduced noise
 - High speaker output power
 - Speaker supply with high supply rejection
 - Fully differential input and output connections for noise reduction in noisy environment
 - Pop-free output drivers
- **Flexible input configuration**
 - Up to four differential microphone or line inputs
 - Many mixing options
 - Received voice, handset MIC, headset MIC, FM radio or other line inputs all supported
 - Stereo record path for karaoke or other mixing / re-sampling
- **Low noise microphone bias**
 - Microphone current and short circuit current detect
- **Class D / AB speaker driver**
 - Zero-risk technology for GPS and other EM-sensitive applications
 - Large power reduction when class D enabled
 - Software-controlled selection of AB or D mode with no hardware modification required
 - Can switch dynamically between AB and D modes if required (e.g. when changing usage mode)
 - Ultra-low leakage and high PSRR allows direct battery connection
 - Fully internal speaker boost to maximise speaker output volume
 - Less than 0.1% THD at 1W output
- **Headphone drivers**
 - 4 outputs capable of driving 16 Ω loads such as headphones or ear speaker
 - Fully differential headphone drive to eliminate ground noise and crosstalk
 - Capless and AC-coupled modes
 - 13mW total power during stereo DAC playback
- **Line outputs**
 - Mono or stereo differential outputs
 - Microphone output to voice codec
 - Output to additional external speaker driver
 - Stereo line output
- **Digital interfaces**
 - I²S and DSP/PCM modes, with A-law and μ -law companding support
 - Time division multiplexing available on audio interface
 - Mixed ADC and DAC sample rates
 - 2 or 3-wire control interface with selectable address
- **GPIO**
 - Up to eight button and accessory detect inputs with pin status readback
 - Additional DAC interface for connection to a second processor
 - Alternative master clock
 - Clock output
- **Small footprint**
- **5x5mm BGA package**
- **Ultra-low power PLL**

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