# WM8993 Product Brief

## Audio Hub CODEC for Multimedia Phones

### DESCRIPTION

The WM8993 is a highly integrated ultra-low power hi-fi CODEC designed for portable devices such as multimedia phones.

A stereo 1W/channel speaker driver can operate in class D or AB mode. Low leakage and high PSRR enable direct battery connection for the speaker supply.

Class W headphone drivers provide a dramatic reduction in playback power and are ground-referenced. Active ground loop noise rejection and DC offset correction help prevent pop noise and ground noise from degrading headphone output quality.

Powerful mixing capability allows the device to support a huge range of architectures and use cases. A highly flexible input configuration supports multiple microphone or line inputs (mono or stereo, single-ended or differential).

A fully differential internal architecture, active ground noise rejection and on-chip RF filtering ensure a very high degree of noise immunity.

ReTune™ Mobile provides powerful parametric equalization for optimizing speaker characteristics. Programmable dynamic range control is also available for maximizing loudness, protecting speakers from clipping and preventing premature shutdown due to battery droop.

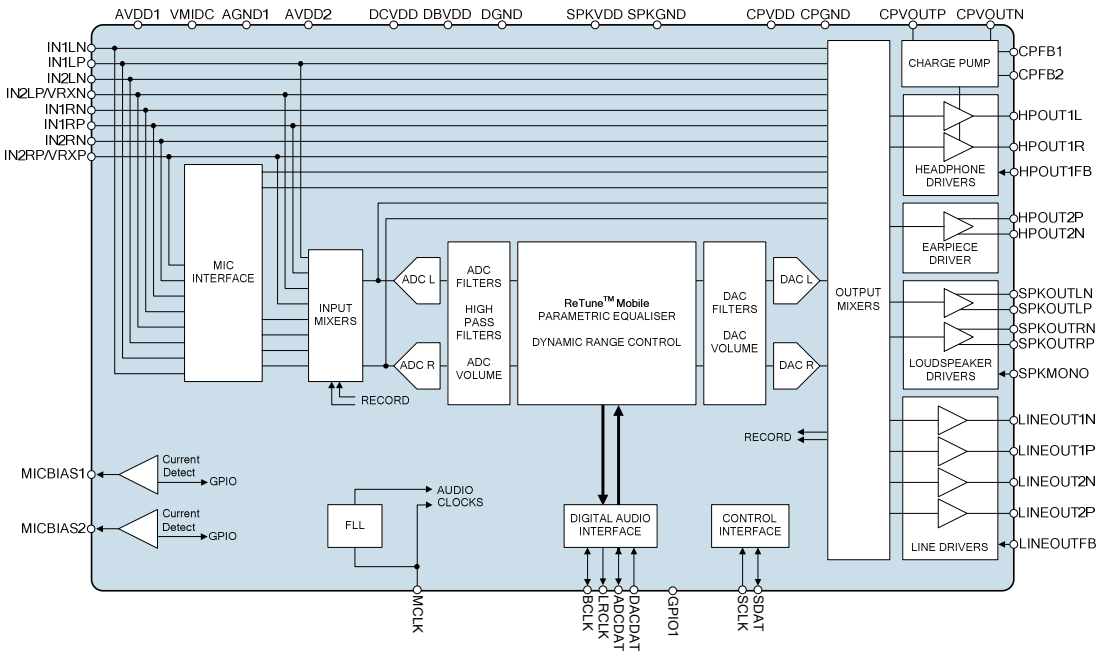
The WM8993 is supplied in very small and thin 48-ball W-CSP package, ideal for portable systems.

### FEATURES

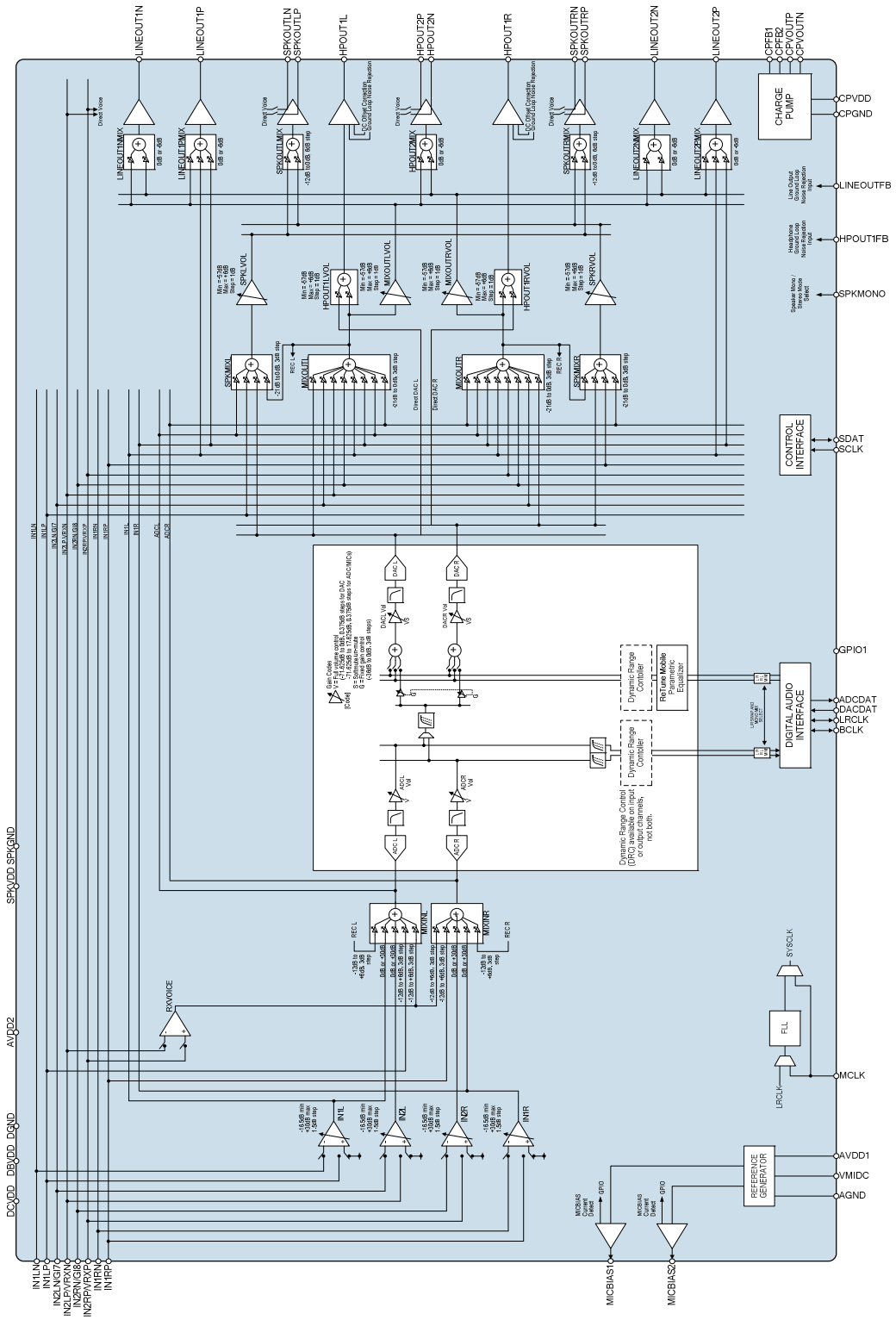
- 100dB SNR during DAC playback ('A' weighted)
- Low power, low noise MIC interface
- 2W mono / 1W stereo class D or AB speaker driver
  - 1W/channel into 8Ω BTL speaker at <1% THD
- ReTune™ Mobile parametric equalizer
- Dynamic range compressor
- Low power Class W headphone drivers
  - Integrated charge pump
  - 5mW total power for DAC playback to headphones
- Digital audio interface
  - All standard data formats and 4-channel TDM supported
  - All standard sample rates from 8kHz to 48kHz
- Low power FLL
  - Provides all necessary internal clocks
  - 32kHz to 27MHz input frequency
  - Self-clocking mode for class D and charge pump
- 2 line outputs (single-ended stereo or differential mono)
- Dedicated earpiece driver
- "Direct voice" paths to outputs
  - Low noise paths bypass all internal mixers
  - Low power consumption
- Active noise reduction
  - DC offset correction removes pops and clicks
  - Ground loop noise cancellation
- 48-ball W-CSP package (3.64x3.54x0.7mm,0.5mm pitch)

### APPLICATIONS

- Multimedia phones



## BLOCK DIAGRAM



## ORDERING INFORMATION

| ORDER CODE | TEMPERATURE RANGE | PACKAGE | MOISTURE SENSITIVITY LEVEL | PEAK SOLDERING TEMPERATURE |
|---|---|---|---|---|
| WM8993ECS/RV | -40°C to +85°C | 48-ball W-CSP (Pb-free, Tape and reel) | MSL1 | 260°C |

**Note:**
Reel quantity = 3500

## TYPICAL MULTIMEDIA PHONE APPLICATION

Figure 1 shows a typical music phone application. Analogue connections to external voice CODECs, tone/ringtone DACs, handset and headset MICs, Bluetooth, FM radio and a digital audio interface to the processor are all supported.

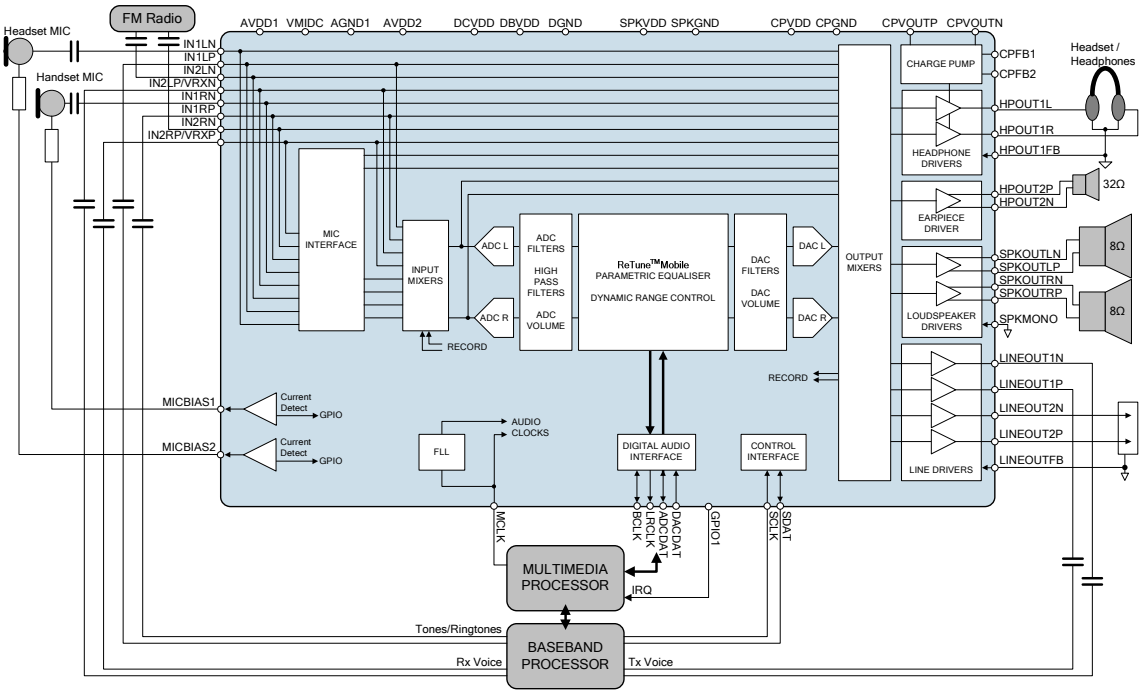



**Figure 1 Multimedia phone using Analogue Connections to MICs, FM Radio, Voice CODEC and Ringtone DACs**

# IMPORTANT NOTICE

Wolfson Microelectronics plc ("Wolfson") products and services are sold subject to Wolfson's terms and conditions of sale, delivery and payment supplied at the time of order acknowledgement.

Wolfson warrants performance of its products to the specifications in effect at the date of shipment. Wolfson reserves the right to make changes to its products and specifications or to discontinue any product or service without notice. Customers should therefore obtain the latest version of relevant information from Wolfson to verify that the information is current.

Testing and other quality control techniques are utilised to the extent Wolfson deems necessary to support its warranty. Specific testing of all parameters of each device is not necessarily performed unless required by law or regulation.

In order to minimise risks associated with customer applications, the customer must use adequate design and operating safeguards to minimise inherent or procedural hazards. Wolfson is not liable for applications assistance or customer product design. The customer is solely responsible for its selection and use of Wolfson products. Wolfson is not liable for such selection or use nor for use of any circuitry other than circuitry entirely embodied in a Wolfson product.

Wolfson's products are not intended for use in life support systems, appliances, nuclear systems or systems where malfunction can reasonably be expected to result in personal injury, death or severe property or environmental damage. Any use of products by the customer for such purposes is at the customer's own risk.

Wolfson does not grant any licence (express or implied) under any patent right, copyright, mask work right or other intellectual property right of Wolfson covering or relating to any combination, machine, or process in which its products or services might be or are used. Any provision or publication of any third party's products or services does not constitute Wolfson's approval, licence, warranty or endorsement thereof. Any third party trade marks contained in this document belong to the respective third party owner.

Reproduction of information from Wolfson datasheets is permissible only if reproduction is without alteration and is accompanied by all associated copyright, proprietary and other notices (including this notice) and conditions. Wolfson is not liable for any unauthorised alteration of such information or for any reliance placed thereon.

Any representations made, warranties given, and/or liabilities accepted by any person which differ from those contained in this datasheet or in Wolfson's standard terms and conditions of sale, delivery and payment are made, given and/or accepted at that person's own risk. Wolfson is not liable for any such representations, warranties or liabilities or for any reliance placed thereon by any person.

## ADDRESS:

Wolfson Microelectronics plc

26 Westfield Road

Edinburgh

EH11 2QB

United Kingdom

Tel :: +44 (0)131 272 7000

Fax :: +44 (0)131 272 7001

Email :: sales@wolfsonmicro.com