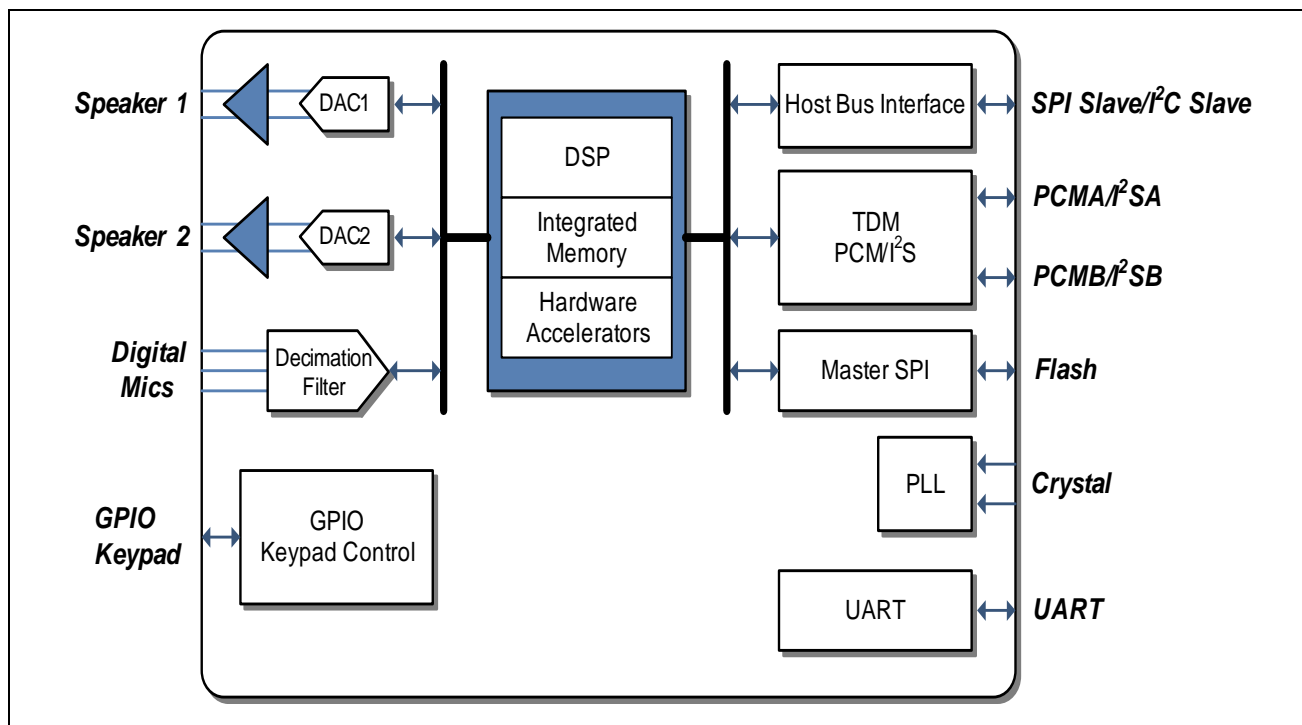


Voice Processing Series Solution Overview

Designed for world-class high definition voice applications, Microsemi's new ZL380 series of audio processors features the company's Microsemi *AcuEdge™* Technology. This innovative technology is a set of highly-complex and integrated algorithms that allows the user to extract more information from the audio environment. The new Microsemi *AcuEdge* Technology consists of license-free, royalty-free intelligent audio IP algorithms. When combined with Microsemi's highly-integrated ZL380 series of audio processors, the solution accelerates customers' time-to-market via validated reference design and easy-to-use development tools including the Microsemi Audio Interface Box (AIB) Kit which utilizes the *MiTuner™* GUI software.



ZL38040 Block Diagram

The ZL38040 Advanced Wideband Audio Processor provides the following enhanced voice processing feature set.

Microsemi ZL38040 Hardware

- Host Interface: SPI, UART, I²C
- Standalone (controllerless) auto-boot from Flash
- Two clock independent TDM ports (PCM or I²S)
- 14 GPIOs, configurable with built-in control features
- Crystal-less operation (with a valid TDM clock)
- Two digital microphone interfaces supporting three digital microphones
- Dual 16-bit digital-to-analog converters (DACs)
 - Headphone amps capable of four single-ended or two differential outputs
 - Two independent headphone drivers
 - 32 mW output drive power into 16 ohms
 - Impulse pop/click protection

Microsemi *AcuEdge*[™] Technology ZLS38040 Firmware

- Wideband and Narrowband Acoustic Echo Cancellation
- Initial convergence conditioning
- Psychoacoustic noise reduction
 - Single microphone
 - Stationary noise reduction
- Keypad scanner
- Low active power consumption
- Multi-tone generation
- DTMF detection
- Call Progress Tone detection
- Caller ID Type 1 & 2 detection
- Signal mixing
 - 44.1 kHz/48 kHz music mixed with 8 kHz/16 kHz voice
- Howling detection/cancellation
- Various encoding/decoding options:
 - 16-bit 2's complement (linear)
 - G.711 A/μ law
 - G.722
- Send and receive path equalizers
 - 16-band for Narrowband mode
 - 22-band for Wideband mode
- Comfort noise generation
- 44.1 kHz/48 kHz bypass mode
- Configurable Cross-Point Switch

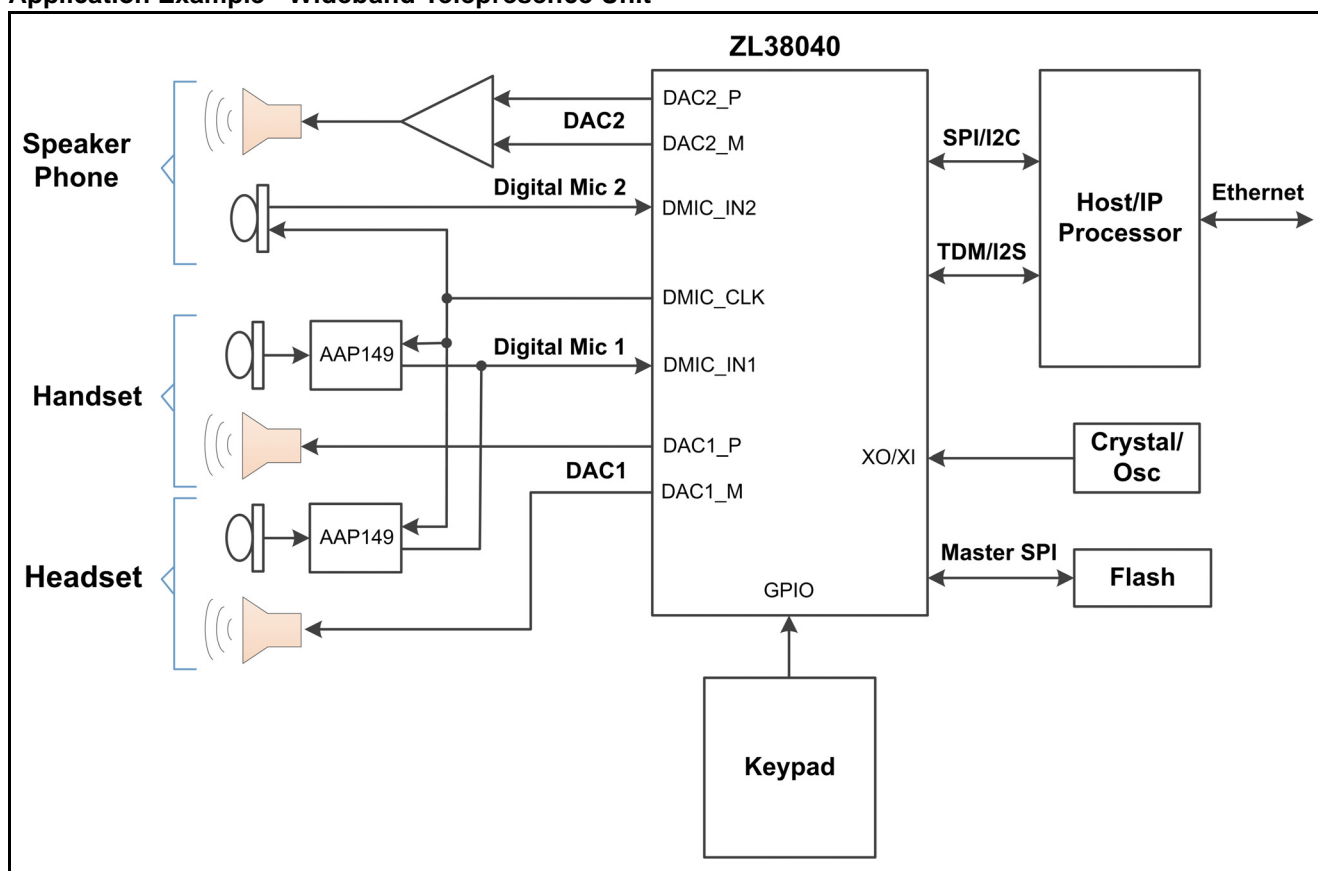
AEC Auto-Tuning

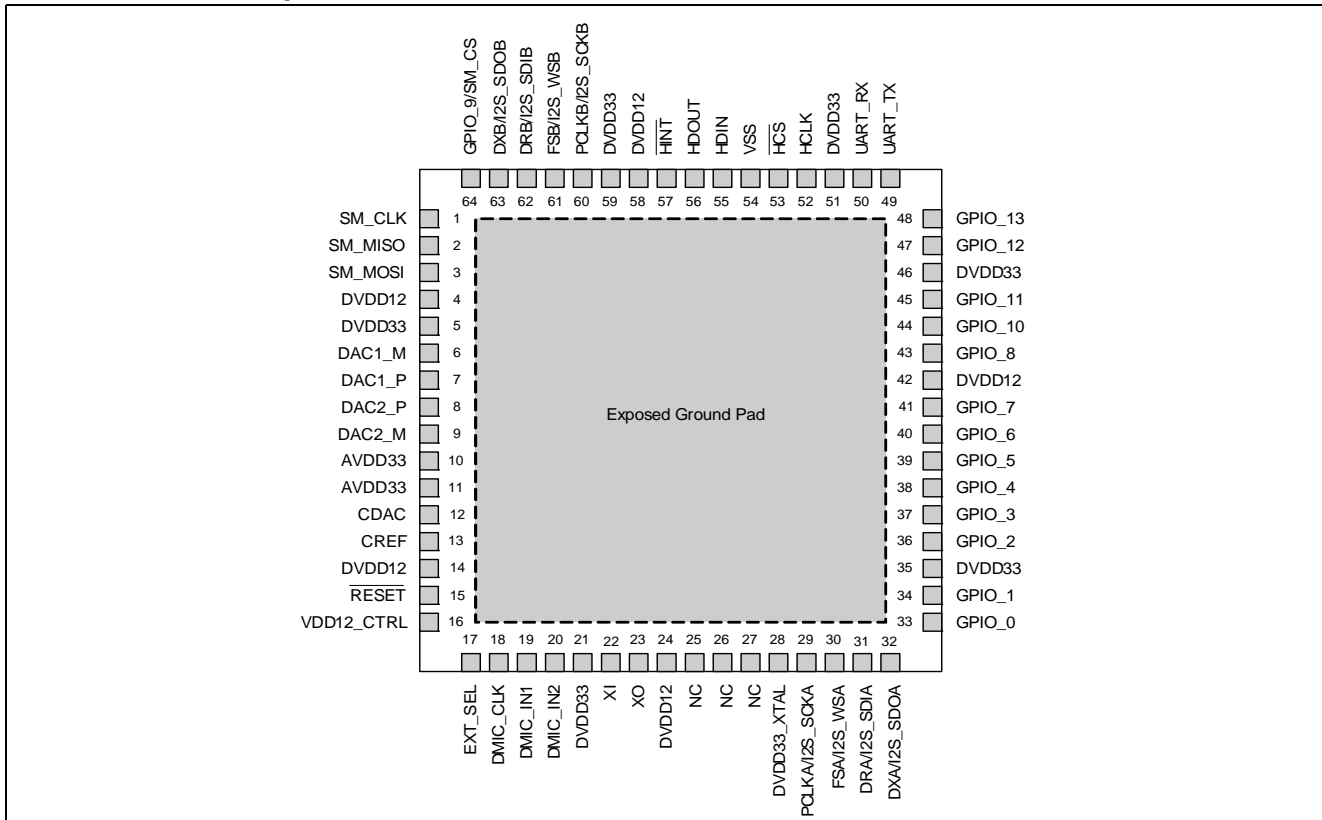
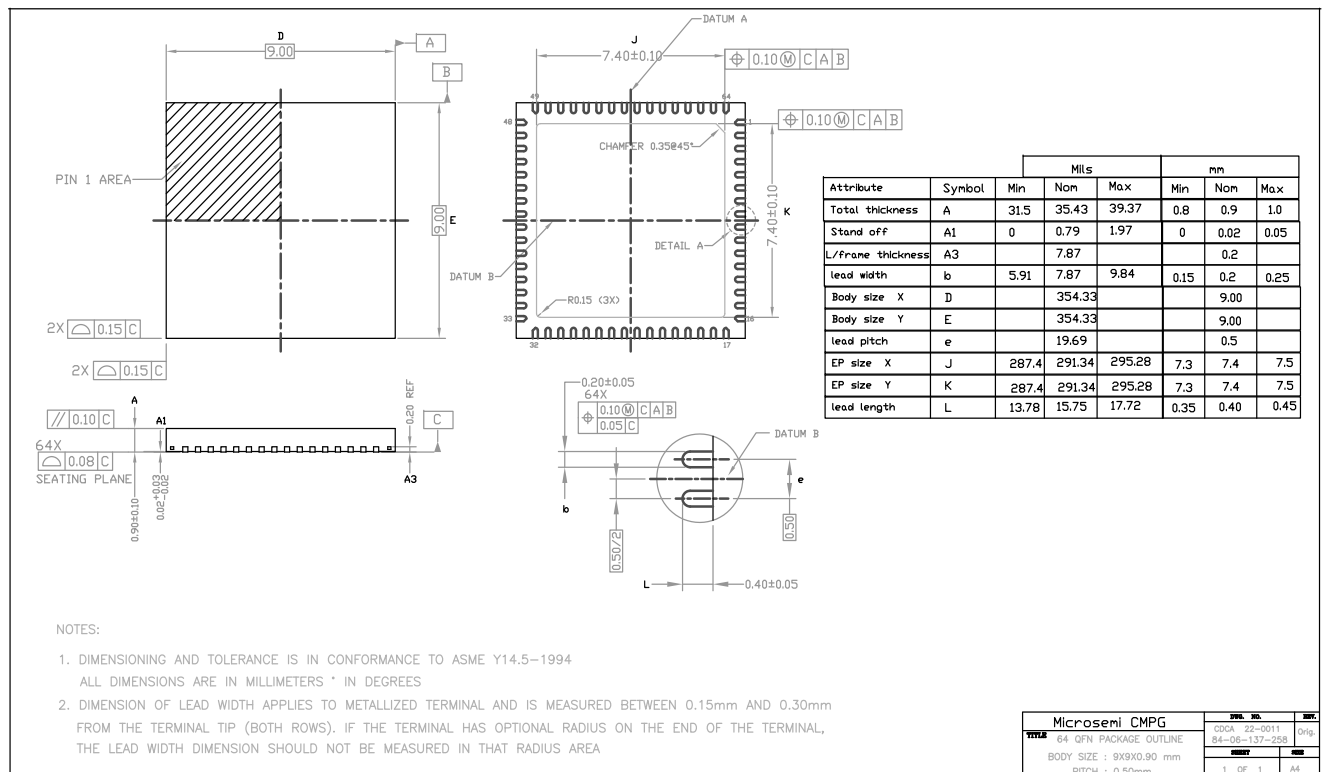
To optimize the acoustic properties of a given system design, the Audio Processor firmware requires gain and level tuning. The mechanical design, including the speaker and microphone quality and placement, will all affect the system's acoustic performance. Microsemi has developed *MiTuner™* GUI Software (ZLS38508) and the Microsemi Audio Interface Box (AIB) hardware (ZLE38470) to automatically optimize the firmware's tunable parameters for a given hardware design, facilitating the system design process and eliminating the need for tedious manual tuning. The *MiTuner* GUI Software provides step-by-step instructions that allow the software's algorithms to achieve a high level of acoustic performance for a given enclosure.

Highly Configurable for Multiple Applications

- Wideband Telepresence device (shown below)
- Home Automation
- Wideband phone

Application Example - Wideband Telepresence Unit



Device Pinout - Top View

Package Outline (64-Pin QFN)


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