

# ZL38063

## Microphone Array ASR-assist Audio Processor

The ZL38063 is part of Microsemi's Timberwolf audio processor family of products that improves Automatic Speech Recognition (ASR) performance at extended distances with barge-in capability and is optimized for detecting voice commands.

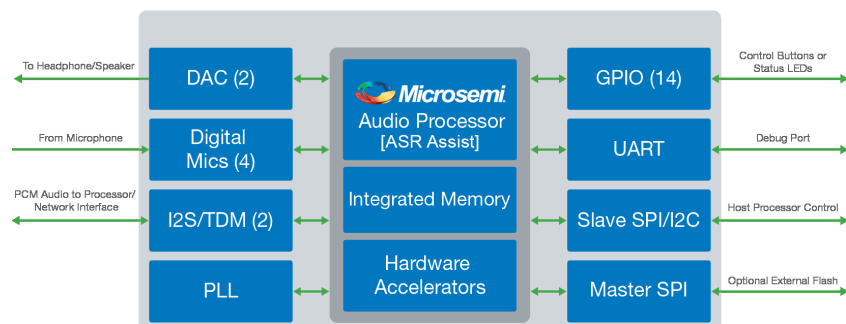
The Microsemi *AcuEdge*™ Technology ZL38063 device is specifically designed for televisions, set-top boxes, and smart speakers, but works equally well in other connected home applications. The device is capable of both voice control and 2-way full duplex audio with voice enhancements such as Acoustic Echo Cancellation (AEC), Noise Reduction (NR) to improve both the intelligibility and subjective quality of voice in harsh acoustic environments.

Microsemi offers additional tools to speed up the product development cycle. The *MiTuner*™ ZLS38508 or ZLS38508LITE GUI software packages allow a user to interactively configure the ZL38063 device. The optional ZLE38470BADA Automatic Tuning Kit provides automatic tuning and easy control for manual fine tuning adjustments.

### Applications

- Integrated smart home gateways
- Connected home devices:
  - Set Top Boxes
  - Smart Speakers
  - Digital Assistants

### Block Diagram



### Ordering Information

- ZL38063LDF1: 64-pin QFN (9×9) package (Tape and Reel)
- ZL38063LDG1: 64-pin QFN (9×9) package (Tray)
- ZL38063UGB2: 56-ball WLCSP (3.1×3.1) package (Tape and Reel)

These packages meet RoHS 2 Directive 2011/65/EU of the European Council to minimize the environmental impact of electrical equipment.

### Microsemi *AcuEdge*™ Technology ZLS38063 Firmware

The ZL38063 can run different Firmware images that target specific modes of operation. Firmware images can be swapped during normal operation to switch modes dynamically. Microsemi provides firmware images for two basic operational modes:

#### Two way voice communication

- Supports 2-3 microphone linear arrays for 180° audio pick up
- Supports 3 microphone off-axis or triangular arrays for 360° audio pick up
- Supports device cascading to allow up to a 6 microphones array
  - Full Narrowband and Wideband Acoustic Echo Cancellation (AEC) operation
    - Supports long tail AEC (up to 256 ms)
    - Non-Linear AEC provides higher tolerance for speaker distortions
    - Non-Linear processor
- Noise reduction
- Far-field microphone processing

#### ASR Assist Algorithms

- Supports 2 microphone linear arrays for 180° audio pick up
- Supports 3 microphone off-axis or triangular arrays for 360° audio pick up
- Supports device cascading to allow up to 6 microphones in a circular array for 360° audio pick up
- Support for Barge-in, or incoming trigger 'spotting' in the presence of DAC audio output
- Noise reduction
- Enhanced far-field support for distances up to 16 feet from the microphone.

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### Hardware Features

- DSP with Voice Hardware Accelerators
- SPI or I2C Slave port for host processor interface
- General purpose UART port for debug
- Master SPI port for serial Flash interface
  - Boots from SPI or Flash
- Flash firmware can be updated from SPI Slave
- 14 General Purpose Input/Output (GPIO) pins (11 with the 56 pin WLCSP)
- 2 low power modes controlled by reset



### The *MiTuner*™ Automatic Tuning Kit and ZLS38508 *MiTuner* GUI

Microsemi's Automatic Tuning Kit option includes:

- Audio Interface Box hardware
- Microphone and Speaker
- ZLS38508 *MiTuner* GUI software
- Allows tuning of Microsemi's *AcuEdge* Technology Audio Processor

The ZLS38508 software features:

- Auto Tuning and Subjective Tuning support
- Provides visual representations of the audio paths with drop-down menus to program parameters, allowing:
  - Control of the audio routing configuration
  - Programming of key blocks in the transmit (Tx) and receive (Rx) audio paths
  - Setting analog and digital gains
- Configuration parameters allow users to “fine tune” the overall performance

### Tools

- ZLK38000 Evaluation Kit
- *MiTuner*™ ZLS38508 and ZLS38508LITE GUI
- *MiTuner*™ ZLE38470BADA Automatic Tuning Kit



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