ZLK38AVS Automatic Speech Recognition Assist Development Kit for Amazon AVS

Product Brief

Product Overview

Microsemi's AcuEdge™ ZLK38AVS Development Kit for Amazon AVS features Microsemi's ZL38063 Timberwolf audio processor. The ZL38063 provides a number of audio enhancements to improve trigger word detection and to enhance Amazon's AVS detection and accuracy. The ZL38063 also provides a number of additional features to increase the functionality of the system beyond voice recognition. These include 2-way voice communication and audio event detection. The kit is designed to help developers quickly and easily set up prototypes that demonstrate a high quality voice recognition interface. The ZL38063 provides audio enhancement that performance noise reduction and far field processing to allow speech recognition at distance in noisy, real-world conditions. In addition to allowing far field processing the ZL38063 supports barge-in through its world class acoustic echo cancellation thus allowing users to interrupt their Alexa device when it's playing audio.

The ZL38AVS supports two microphone configurations, a 2 microphone linear array supporting 180° audio pick up and a 3 microphone triangular array supporting 360° audio pick up with direction of arrival estimation. Both the 180° and 360° audio pick up solutions are designed to recognize the Alexa wake word and deliver audio-enhanced speech requests for cloud processing, from anywhere in a room.

The ZL38AVS Development Kit for Amazon AVS reduces engineering time and costs associated with developing noise-robust voice-enabled devices.

The ZL38AVS Development Kit is compatible with the Amazon AVS sample application for Raspberry Pi (RPi).

Key Features and Benefits

- Patented AcuEdge technology audio enhancement processes far field signal by instantaneously adjusting audio level and performing noise cancellation
- Supports both 180° and 360° audio pick up using 2 and 3 microphone beamforming
- Barge-in support enabled by full duplex acoustic echo cancellation (AEC) that detects the Alexa wake word even during loud playback of music or voice prompts
- Integrated trigger Word detection
- Audio Event detection (smoke and carbon monoxide alarm detection)
- 2-Way full duplex voice communication

Applications

Voice-enabled applications such as -

- Home Gateway/Controller
- Speaker/Sound Bar
- TV/Set-Top Box

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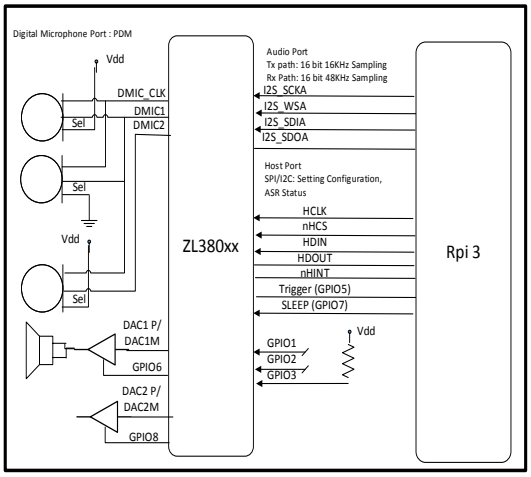
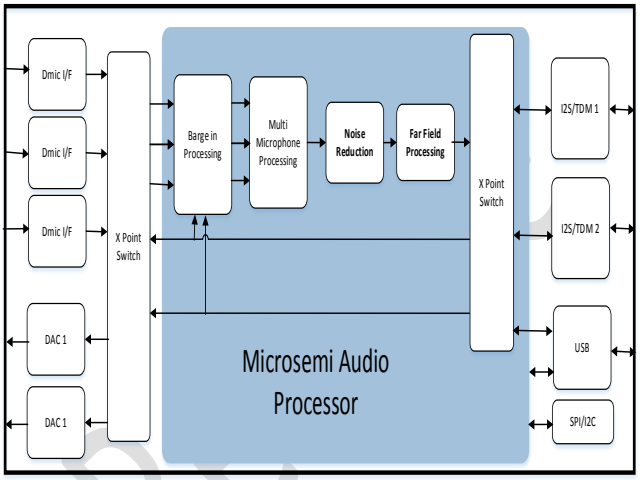
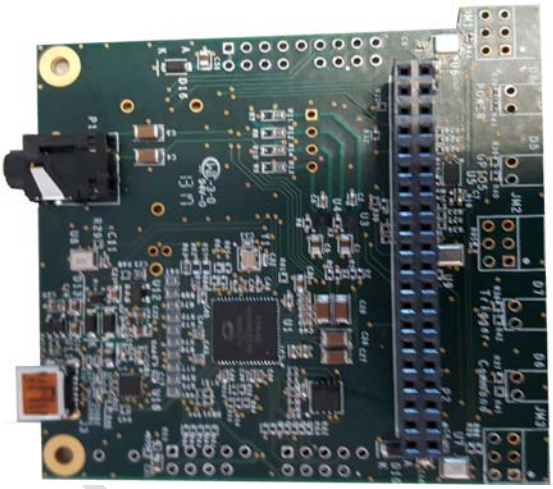
ZLK38AVS Simplified Block Diagram



ZL38063 Simplified Block Diagram



Microsemi ZL38AVS Development Kit Board



Microsemi ZL38AVS Development Kit Set Up

Kit Contents

The Microsemi ZLK38AVS Development Kit for Amazon AVS includes the following:

- ZLK39AVS Evaluation Board
- Micro-USB cable
- Speaker/development board holder
- USB flash drive

What's not included in the kit

- Raspberry Pi3 board
- Memory card for Raspberry Pi
- External Powered Speaker
  - Recommended JBL Clip speaker (https://www.amazon.com/gp/product/B00KH636V2?ref_=sr_1_7&qid=1491831969&sr=8-7&keywords=jbl%2Bclip%2Bspeaker&th=1&pldnSite=1)

ZL38AVS Development Kit Specifications

ZLK38AVS Evaluation Board	
Physical Characteristics Dimensions (mm)	
Operating temperature (Max/Min) °C	-40 °C to 85 °C
External Interfaces	
Raspberry Pi 3 Header	P2 • I2S port o P2/36 – Pi_LRCLK o P2/37 – Pi_DIN o P2/38 – D_OUT o P2/24 – PI_SCLK o • SPI o P2/39 - HINTN o P2/11 – PI_BITCLK o P2/20 – PI_MOSI o P2/22 – PI_MISO o P2/23 – PI_CS0 • 8 GPIO o P2/4 – GPIO6 (Generic IO) o P2/6 – GPIO7 (Generic IO) o P2/7 – GPIO10 (Generic IO)

	o P2/8 – GPIO8 (Generic IO) o P2/9 – GPIO11 (Generic IO) o P2/15 – GPIO12 (Generic IO) o P2/17 – GPIO13 (Generic IO) o P2/21 – GPIO5 (Generic IO)
Analog Header	JMMA1 • DMic o JMMA1/12 DMIC Clock o JMMA1/14 DMIC1 o JMMA1/16 DMIC2 • Analog out o JMMA1/5&7 - +/-Analog out 1 o JMMA1/6&8- +/-Analog out 2 • 3 GPIO o JMMA1/13 – GPIO5 (Generic IO) o JMMA1/15 – GPIO10 (Generic IO) o JMMA1/18 – GPIO8 (Generic IO)
SPI Flash devices	U2 is an optional SPI Flash component used to store ZL38063 firmware.
I2C EEPROM	U5 U2 is an optional I2C EEPROM component automatically configure the Raspberry Pi board
USB	J3: Optional USB power and debug port
Debug Headers	JAIB2/2 – Auto tuning headers
Digital microphone headers	JM1-4 – Optional header for off board microphones
Audio Characteristics	
4 Digital Microphones	• 4 on board digital microphones placed to support 2 or 3 microphone linear array for 180° audio pick up or 3 microphone triangular array 360° audio pick up • Digital Microphone : AKU441
Analog output	2 x 2.65 Low cost class D audio amplifier (NCP2820)
Connectors	
Stereo 3.5 mm male-to-male audio cable	P1/J1 – drives output stereo speakers
Micro-USB cable	J1: Sends the processed microphone signal to the Amazon AVS.

Ordering Information

Distributor	URL	Part Number	Description
Arrow Electronics		ZLK38AVS	Development Kit, for

			Amazon AVS
Future Electronics		ZLK38AVS	Development Kit, for Amazon AVS

To learn more about Microsemi and its development kit, please visit http://www.microsemi.com

To learn more about Amazon Alexa Voice Service and access the Amazon AVS API reference guide, visit https://developer.amazon.com/alexa-voice-service/

For more information about all Microsemi products
visit our website at
www.microsemi.com

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Microsemi

Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo CA 92656 USA
Within the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996

Microsemi Corporation (NASDAQ: MSCC) offers a comprehensive portfolio of semiconductor solutions for: aerospace, defense and security; enterprise and communications; and industrial and alternative energy markets. Products include mixed-signal ICs, SoCs, and ASICs; programmable logic solutions; power management products; timing and voice processing devices; RF solutions; discrete components; and systems. Microsemi is headquartered in Aliso Viejo, Calif. Learn more at www.microsemi.com.