Voice Capture Development Kit
For Amazon AVS – CRD1569-1

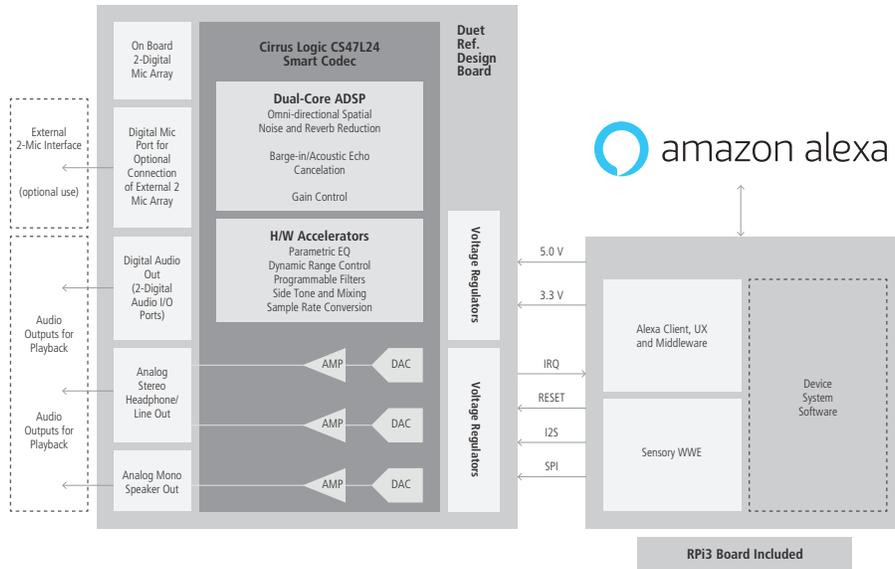## Two-Mic Rapid Development Platform for Alexa-Enabled Smart Home Products

Based on Cirrus Logic's SoundClear® Voice Control two-mic reference board, the CRD1569-1 provides a complete platform for the evaluation, prototyping and development of smart home products enabled with Alexa Voice Service (AVS), and requires minimal customization to reduce time-to-market. This kit is designed to enhance the end-user experience of AVS by increasing accuracy of voice interaction and by supporting high-fidelity audio playback. This fully functioning solution includes all required hardware and firmware, plus a web-based server control console to manage wake word, AVS, noise suppression, and barge-in (AEC) performance. Prototype integration is made simple with options to direct connect or ribbon cable connect the reference board to a Raspberry Pi 3 (RPi3) and use a single 5 V supply for both boards. The firmware control console simplifies operation of the various RPi3 applications and provides a robust user friendly GUI to perform acoustic tuning and diagnostic functions. The reference board schematic design and bill of materials are designed to be pasted into most Alexa-enabled device applications with minimal customization to accelerate product introduction. The board's sophisticated CS47L24 smart codec with integrated hi-fi data conversion and amplification, combined with the high performance dual CS7250B digital MEMS mic array, provide superior product performance.

Features

- Enhanced "Alexa" wake-word triggering and command interpretation at distance and in noisy environments
- Increases accuracy and reliability of Alexa voice responses to voice requests
- Acoustic Echo Cancelation (AEC) enables users to "barge-in" during Alexa response and music playback and be understood
- Consumes about 24 mW for continuous voice capture and AEC
- Reference board features the Cirrus Logic CS47L24 dual core, low power smart codec with SoundClear® two-mic voice control DSP firmware
- Integrated stereo hi-fi D/A converter with 121 dB SNR

- Stereo headphone/line out with only 1% THD+N
- Built-in 2 W Class D speaker driver
- Dual Cirrus Logic CS7250B high performance digital MEMS microphone array for omni-directional spatial capture and noise reduction
- Port for connecting optional external digital MEMS microphone array
- Web-based firmware control console for simplified interactive operation, acoustic tuning and diagnostics
- Operates headless and wireless without anything connected to the RPi3 board other than the 5 V power source
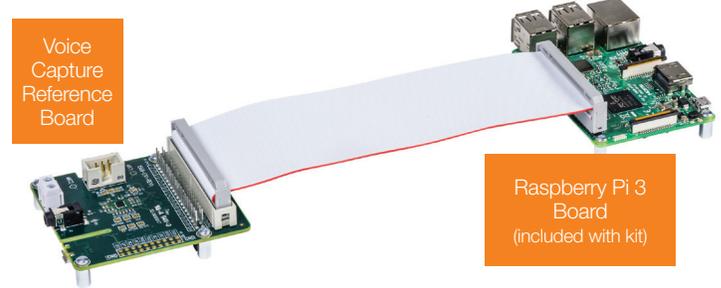
Notes: Cirrus Logic does not own, provide or warrant software components required. Registration with Amazon Developer site required.

Voice Capture Reference Board Block Diagram

Duet Ref. Design Board

On Board 2-Digital Mic Array

Digital Mic Port for Optional Connection of External 2 Mic Array

External 2-Mic Interface

(optional use)

Digital Audio Out (2-Digital Audio I/O Ports)

Audio Outputs for Playback

Analog Stereo Headphone/ Line Out

Audio Outputs for Playback

Analog Mono Speaker Out

Cirrus Logic CS47L24 Smart Codec

Dual-Core ADSP
Omni-directional Spatial Noise and Reverb Reduction

Barge-in/Acoustic Echo Cancelation

Gain Control

H/W Accelerators
Parametric EQ
Dynamic Range Control
Programmable Filters
Side Tone and Mixing
Sample Rate Conversion

Voltage Regulators

Voltage Regulators

AMP — DAC

AMP — DAC

AMP — DAC

5.0 V

3.3 V

IRQ

RESET

I2S

SPI

amazon alexa

Alexa Client, UX and Middleware

Sensory WWE

Device System Software

RPi3 Board Included

"RPi3 Hat" Direct Connection Option

Voice Capture Reference Board

Raspberry Pi 3 Board (included with kit)

Ribbon Cable Connection Option

Voice Capture Reference Board

Raspberry Pi 3 Board (included with kit)

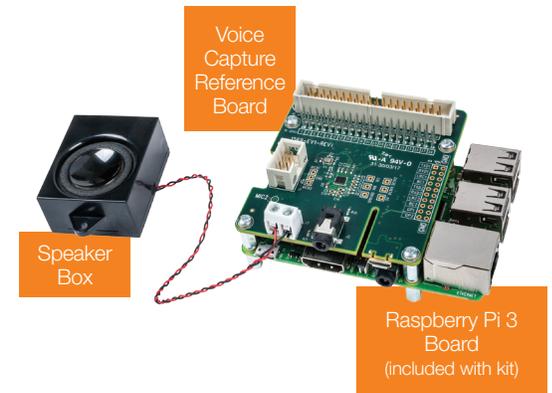## Control Console
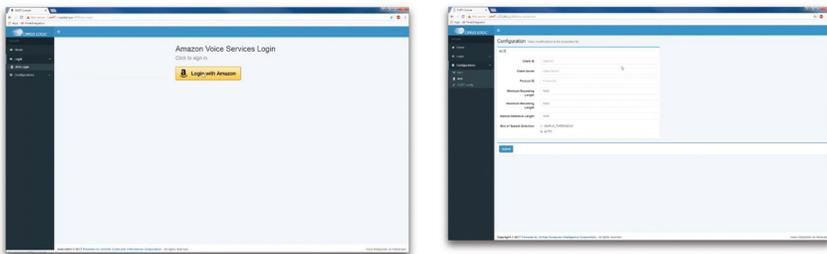
- Sensory Alexa Voice Trigger
- Alexa Voice Service Access
- Built-in wireless and hotspot

Assembled CRD1569-1 Development Kit

Voice Capture Reference Board

Speaker Box

Raspberry Pi 3 Board (included with kit)

CIRRUS LOGIC®

Cirrus Logic, Inc.
800 West Sixth Street
Austin, Texas 78701
United States

T +1-512-851-4000
F +1-512-851-4977

Sales Support
North America +1-800-888-5016
Asia Pacific +852 2376-0801
Japan +81-(3)-5782-8180
Europe/UK +44-(0)-131-272-7000

www.cirrus.com

JULY 2017