

AudioSmart™ 2-mic Development Kit for Amazon AVS



AudioSmart Hands-Free 2-Mic Development Kit for Amazon AVS with Conexant Voice Processing and Alexa Wake Word

Product Overview

Conexant's AudioSmart™ 2-Mic Development Kit for Amazon AVS features Conexant's CX20921 Voice Input Processor with embedded hands-free voice processing technology and preloaded Alexa™ wake word. The kit is designed to help manufacturers and developers quickly and easily build smart home device prototypes that offer an ideal voice user experience.

Enabling speech recognition from a distance requires overcoming substantial acoustic challenges related to echo cancellation, background noise, microphone position, speaker placement and more. Conexant's dual-microphone voice processing solution is designed to recognize the Alexa wake word and deliver speech requests for processing, from anywhere in a room, even in noisy, real-world conditions. The solution also enables voice barge-in capabilities, allowing users to interrupt their Alexa device when it's playing sound.

The AudioSmart 2-Mic Development Kit for Amazon AVS reduces engineering time and costs associated with developing noise-robust voice-enabled devices.

The core component of the kit is Conexant's AudioSmart CX20921 Voice Input Processor running its industry-leading hands-free voice pre-processing software technology. The Conexant hands-free voice input processor system captures the user's voice from anywhere within the room, separates the voice commands from music and voice prompts being played out of the device, even with background noise present, and provides a clean audio signal to the speech recognition engine. This solution ensures that the speech recognition engine hears only the user's command, and nothing else - providing consistent accuracy and an ideal end-user experience.

The AudioSmart 2-Mic Development Kit for Amazon AVS is compatible with the Amazon AVS for Raspberry Pi (RPi) Project.

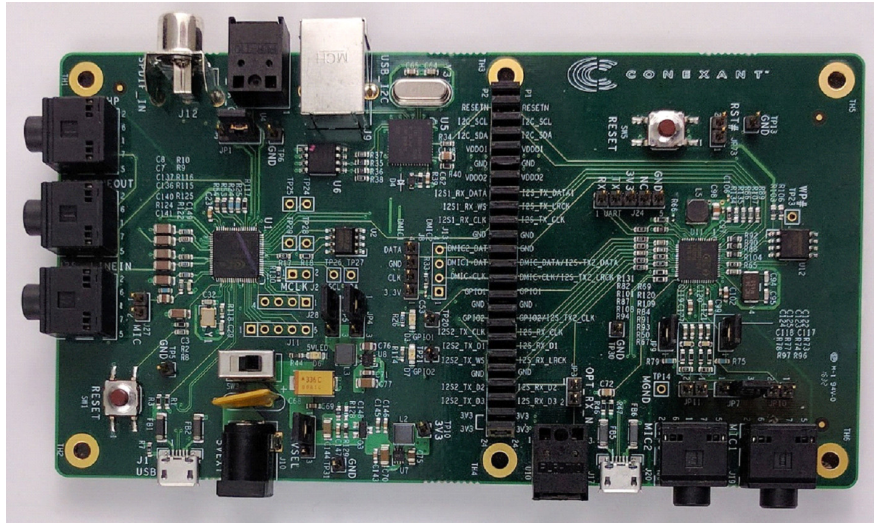
Key Features and Benefits

- Cost-effective hands-free voice interaction with only two microphones
- Proprietary Smart Source Pickup™ (SSP) technology detects voice and cancels noise from all directions around the device (omnidirectionally), even if noise sources are from the same direction as the user
- Best-in-class voice barge-in is enabled by full duplex stereo acoustic echo cancellation (AEC) that detects the Alexa wake word even during loud playback of music or voice prompts
- High-dynamic range analog-to-digital converters (ADC) optimized for hands-free voice applications, supports connections to analog microphones and PDM interfaces for connection to digital MEMS microphones
- Integrated voice trigger function that supports low system power Wake-on-Voice (WoV) function
- Multiple Integrated Interchip Sound (I²S) serial data interfaces
- Inter-Integrated Circuit (I²C) serial control interface
- SPI for low-cost flash support

Applications

- Home Smart appliance
- Home Gateway/Controller
- Lighting
- Speaker/Sound Bar
- Telepresence
- Thermostat
- TV/Set-Top Box

AudioSmart 2-Mic Development Kit for Amazon AVS Evaluation Board



Kit Contents

The Conexant CX20921 AudioSmart 2-Mic Development Kit for Amazon AVS includes the following:

- CX20921 Evaluation Board, G600Z-C00647R30
- Microphone module with two omnidirectional mics
- Microphone holder board
- Stereo 3.5mm male-to-male audio cable
- Micro-USB cable
- Type A to Type B USB cable
- Cable assembly
- +5V power supply for the CX20921 Evaluation Board

Note: Other components required for board evaluation are the Raspberry Pi (RPi3) and powered loudspeakers. These items are not included in the kit.

AudioSmart 2-Mic Development Kit for Amazon AVS Specifications

CX20921 Evaluation Board Features

Physical Characteristics

Dimensions (mm) 78 x 147 x 1.6 ± 10%

Operating temperature (Max/Min) °C 125/0

External Interfaces

USB Full speed USB2.0 Device, supporting up to five fully configurable endpoints.

I2C slave J9: Maximum clock frequency 1 MHz (fast mode plus). The I²C connection is used to program the firmware on the CX20921 Evaluation Board.

I2S-to-USB Playback CODEC

- Two channel I²S out available through pin multiplexing.
- Sample rate support from 8 KHz to 192 KHz.
- Independent clock source
- (U1) Routes processed microphone signals to Amazon AVS. Mic signals are processed via AudioSmart hands-free voice input processing software.

SPI Master Maximum clock frequency up to 50 MHz. See separate Application Note for list of supported SPI Flash devices. U12 is the SPI Flash component used to store CX20921 firmware.

UART J24: Maximum baud rate up to 1.5625 Mbps

GPIO1/2

- GPIO1: Dedicated to a Wake-on-Voice (WoV) function that toggles to wake an external device when the CX20921 recognizes an audio wake trigger event. Used for the low-power embedded trigger mode.
- GPIO2: Generic GPIO

Master Clock Default: Off

Audio Characteristics

ADC Two high performance ADCs with preamplifiers. Supports sample rates from 8 KHz to 96 KHz.

ADC low power mode An enhanced mode that enables reduced power consumption.

ADC Performance

- Dynamic range: 106 dB at 0 dB
- THD -84 dB at -1 dBFS

Microphone Bias Two microphone bias support

Microphone Module Features

Microphone holder board dimensions 38.1 x 147.32 x 1.6 ± 10%

Operating temperature (Max/Min) °C 125/0

Microphone Module

Specifications

- Two stereo omnidirectional Horn microphones
- Microphones are connected via 3.5 mm male audio cable to J19

Connectors

Stereo 3.5 mm male-to-male audio cable J25: Sends the audio response from the Amazon AVS to the CX20921 Evaluation Board. Audio response is routed to the powered speakers via the I2S-to-USB Playback CODEC.

Micro-USB cable J1: Sends the processed microphone signal to the Amazon AVS.

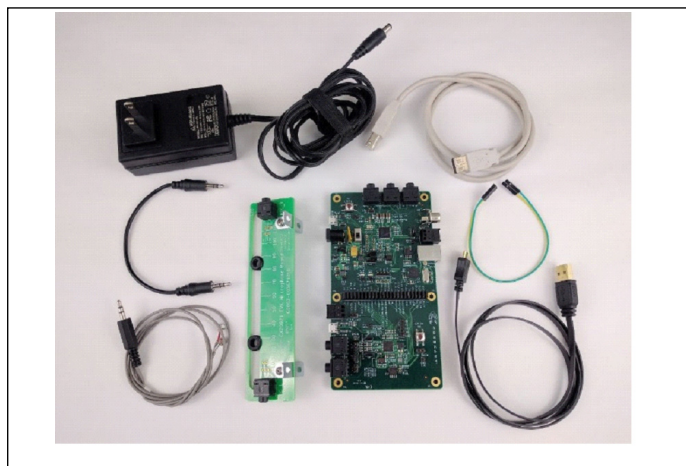
Type A to Type B USB cable J9: Used to flash the CX20921 Evaluation Board with firmware.

Cable assembly P2.pin 14/P2. pin 15: Connects GPIO1/GND pins from EVK to Host processor board (such the Raspberry Pi).

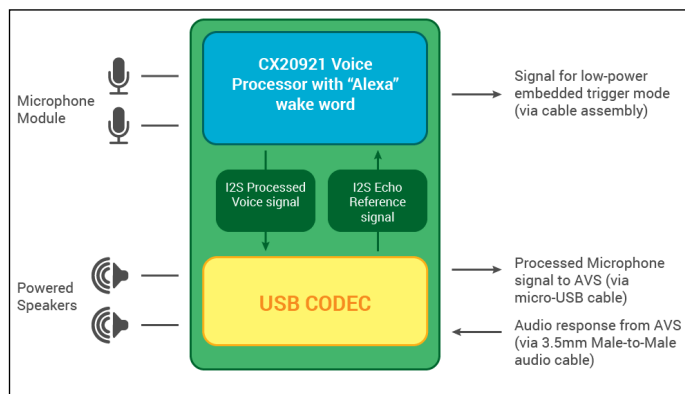
Power Supply

Power Supply input power 5V, min 2A

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Conexant AudioSmart 2-Mic Development Kit for Amazon AVS



CX20921 Evaluation Board Block Diagram

Ordering Information

Distributor	URL	Part Number	Description
Arrow Electronics	https://www.arrow.com/en/products/ds20921-evk/conexant-systems	DS20921-EVK	AudioSmart 2-Mic Development Kit, for Amazon AVS

To learn more about Conexant and its development kit, please visit <http://www.conexant.com/amazon-avs/>

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

The devices in this publication are lead-free (Pb-Free) and China RoHS compliant . Contact the local Conexant sales office for advanced software options.

www.conexant.com

Headquarters: 1901 Main Street, Suite 300 Irvine, CA, 92614
General Information: U.S. and Canada: 888-855-4562 | International: 1 + 949-483-3000

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