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STMicroelectronics Simplifies Creation of Alexa Built-In Smart Home Devices with Amazon-Qualified Reference Design

- *Reference design eases development of simple and cost-effective natural-language understanding and voice-based user interaction for smart-home devices and smart appliances*
- *Qualified by Amazon to use Alexa Voice Service Integration for AWS IoT Core for MCU devices*
- *All-in one design kit with far-field audio detection, local Amazon “Alexa” Wake Word, and connectivity to AVS Integration for AWS IoT Core*

Geneva, November 17, 2020 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, has released an [Amazon-qualified reference design package for smart connected devices](#) leveraging Alexa Voice Service (AVS) Integration for AWS IoT Core, which can be used to create Alexa Built-in products using simple microcontrollers (MCUs).

AVS Integration for AWS IoT Core has the ability to transform the way users interact with smart “things,” bringing cloud-based Alexa experiences to items such as toasters, cookers, thermostats, blinds, hairdryers, and many others with no need for significant investment in electronic hardware. This could hasten the end for traditional buttons and dials, leading to new generations of products that offer easy and natural user interactions, adaptable smart features, and access to cloud services such as cooking advice or reordering of consumables.

ST’s Amazon-qualified solution jump-starts the design of Alexa-enabled appliance controllers, with Alexa voice-user-interface software already integrated on high-performing MCUs of the STM32* family. The energy-efficient STM32, being the world’s most successful 32-bit Arm® Cortex®-M MCU family, is ideal for low-cost, small, and simple connected devices that require state-of-the-art features such as far-field audio capture and natural-language understanding.

“We believe the AVS Integration for AWS IoT Core can revolutionize users’ expectations of smart devices by enabling easier access to their powerful features and delivering more rewarding experiences,” said Daniel Colonna, Marketing Director, Microcontroller Division, STMicroelectronics. *“Our reference design leverages the inherent strengths of STM32 microcontrollers and the supporting solution to enable cost-efficient products with unbeatable functionality, small size, and fast time to market.”*

Further Technical Information

ST's [AVS Integration for AWS IoT Core reference design](#) contains a compact 36mm x 65mm main board that combines a [high-performance STM32H743 MCU](#) and Wi-Fi module.

Unlike other devices commonly used for Alexa products, such as digital signal processors (DSPs) and flashless processors, STM32 MCUs integrate all necessary system features including powerful audio front-end processing, local wake-word detection, communication interfaces, and memory, including RAM and Flash, in a single chip. This integration enables the board to have small dimensions and a simple layout for cost-effective deployment in customers' end products.

The audio front end delivers outstanding far-field voice detection, even in noisy environments and with closely spaced microphones. Created by ST Authorized Partner DSP Concepts, distributed by ST as part of the STM32 MCU and supported by ST channels, the front end comes with a free Audio Weaver tool license to help users easily fine-tune their designs.

"The STM32H7's combination of large internal RAM and Flash, peripheral integration, and high-speed processor enables TalkTo, our high-performance audio front-end, to drive significantly better performance in real-time," said Paul Beckmann, DSP Concepts Founder and CTO.

"TalkTo is delivered through Audio Weaver, so product makers can quickly design, develop and deploy a wide range of voice-enabled products."

Leveraging the features of the high-performance STM32 microcontrollers, users can customize and scale their designs by adding enhancements such as a second wake word, extra local commands, and a graphical display to combine with the voice-command capability for an even more compelling user experience.

Further simplifying prototyping and development, the reference design hardware includes an audio daughter board as a separate module. This contains an ST [FDA903D audio codec](#), user LEDs and buttons, and two [MP23DB01HP MEMS microphones](#) spaced at 36mm for size-constrained products such as power switched plugs. The hardware's modularity lets users implement a custom daughter board if application-specific mic spacing, acoustics, and user-interface definitions are needed.

The reference design includes fully developed software that provides the features needed to support Alexa products, including:

- Audio-capture software
- Advanced Audio Front End (AFE) with noise reduction, echo cancellation and advanced beam-forming signal processing for far-field audio detection
- Amazon "Alexa" Wake Word
- Connectivity to AWS IoT
- Audio output software

Working with this reference design enables product designers to certify new end products with AVS faster and more easily than bringing up the entire system independently. Both the hardware and software content can be easily adapted to support individual customers' new-product concepts.

The bill of materials (BOM) for the reference design is engineered to be less than \$10 when purchasing the components in high volumes. Please contact your ST sales office for pricing options and sample requests.

You can also read a blogpost at <https://blog.st.com/alexa-voice-service/>

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