

## Synaptics® CX20924 4-mic Far-Field Voice Input Processor SoC

### AudioSmart® Product Brief

#### Four-Microphone Far-Field Input Subsystem with Integrated Low-Power Wake Word

The Synaptics CX20924 is a high-performance, 4-mic far-field voice input processor System-on-Chip (SoC). The CX20924 is the first product in this category with an integrated voice trigger function that supports a low system power Wake-on-Voice (WoV) function and 360-degree Smart Source Locator (SSL) that detects user's location around the device.

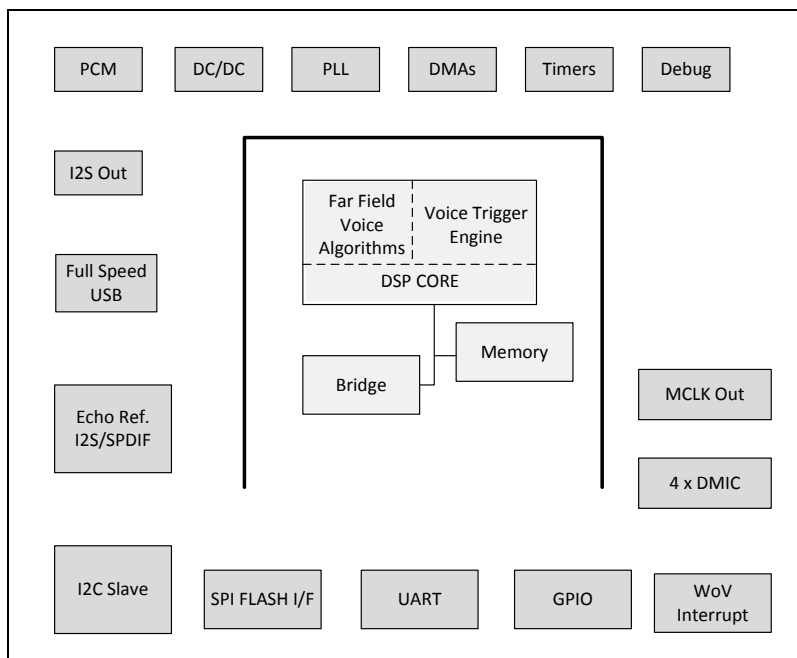
The device includes a Pulse Density Modulated (PDM) interface with digital decimation filters that supports up to four high-performance digital microphones, a powerful dual core 32-bit hardware Digital Signal Processor (DSP), and integrated power management.

Combined with Synaptics' AudioSmart® far-field voice input processing software suite, including four-microphone Smart Source Pickup (SSP) noise suppression and full-duplex Acoustic Echo Cancellation (AEC), the CX20924 is the ideal turnkey solution for adding voice control, 360-degree SSL, voice search, and Voice over Internet Protocol (VoIP)/speakerphone functionalities to SmartTV, Smart Speakers, Set-Top Box (STB), Smart appliances, and many tabletop consumer electronics devices.

The CX20924 device supports four digital microphones using two stereo digital PDM microphone external interfaces. Each Digital Microphone Interface (DMIC) supports sample rates from 8kHz to 96kHz. The CX20924 assists manufacturers and developers to prototype and develop Amazon Alexa™-enabled devices.

Synaptics' proprietary far-field AudioSmart algorithms leverage the built-in hardware to deliver a superior voice interactive experience in the most challenging room environments. The voice processing chain also supports multiple modes of processing, which are independently optimized for voice communication and automatic speech recognition.

#### System Block Diagram



When the PDM microphone and DSP are active in the WoV mode, the device consumes less than 70mW, which is well below the 0.5W EC 1275/2008 requirement for standby power.

#### Key Features

- 4-mic SSL identified the user's direction in 360 degrees.
- Low-power WoV mode with embedded third-party voice wake-up engine
- Enables premium-performance Automatic Speech Recognition (ASR) and excellent voice clarity with four microphones using Synaptics' AudioSmart voice input processing software, which includes:
  - 4-mic SSP noise suppression
  - Full-duplex AEC
- Compatible with multiple leading embedded and server-based speech recognition vendors

#### Applications

- Voice-controlled Smart TV/STB
- Smart Bluetooth/WiFi speaker
- Voice interactive smart appliances
- Internet of Things (IoT) devices

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### Additional Features

- Powerful, dual-core 32-bit DSP
- I<sup>2</sup>S serial data interfaces
- I<sup>2</sup>C serial control interface
- USB 2.0 full-speed compliant audio data and control interface
- Serial Peripheral Interface (SPI) for low-cost flash support
- Supports four MEMS digital microphones using two stereo data pins
- Only supports digital microphones
- 7x7mm 60 QFN package

### Ordering Information

Ordering Part Number	Part Number	Description	Package	Conditions
CX20924-21Z	CX20924	Four-Microphone Far-Field Voice Processor SoC	60 QFN 7x7mm	0 to 70°C

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