

## Synaptics® CX20921 Dual-Mic Far-Field Voice Processor SoC

### AudioSmart® Product Brief

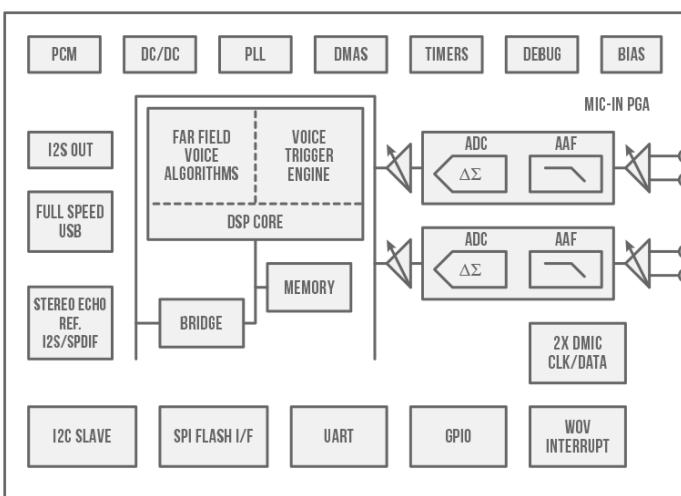
#### Standalone 2-Mic Far-Field Subsystem with Integrated Low-Power Wake-on-Voice (WoV)

The Synaptics CX20921 is a high-performance, far-field voice input processor System-on-Chip (SoC). The CX20921 is the first product in this category with an integrated voice trigger function that supports a low system power Wake-on-Voice (WoV) function. The device includes two 24-bit microphone Analog-to-Digital Converters (ADCs), 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 Smart Source Pickup (SSP) noise suppression and full-duplex stereo Acoustic Echo Cancellation (AEC), the CX20921 is the ideal turnkey solution for adding voice control, voice search, and Voice over Internet Protocol (VoIP)/speakerphone functionalities to SmartTV, Set-Top Box (STB), Smart appliances, digital assistants, and automotive hands-free control and communication systems.

The CX20921 device supports a microphone array with up to two synchronized ADCs and programmable preamplifiers. Each pre-amplifier is paired with a dedicated bias supply to eliminate crosstalk. The entire input path guarantees 106dB dynamic range, which maximizes speech-to-noise ratio with low boost and prevents microphone saturation.

#### System Block Diagram



Synaptics' proprietary far-field AudioSmart software leverages 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.

When ADC and DSP are active in the Wake-on-Voice (WoV) mode, the device consumes less than 70mW, which is well below the 0.5W EC 1275/2008 requirement for standby power.

#### Key Features

- Low-power WoV mode with embedded third-party voice wake-up engine
- Enables high-performance Automatic Speech Recognition (ASR) and excellent voice clarity with only two mics using Synaptics' AudioSmart voice input processing software, which includes:
  - SSP noise suppression
  - Full-duplex stereo AEC
- Compatible with multiple leading embedded and server-based speech recognition vendors
- Dual far-field, 24-bit, 106dB dynamic range ADCs with mic pre-amplifier:
  - Enables low mic gain for far-field signals without saturation for loud near field signals

#### Applications

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

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### Additional Features

- Raw audio sample rates from 8kHz ~ 96kHz
- 0.125dB analog front-end gain resolution
- Dedicated microphone bias for low crosstalk
- Dual serial data interface—I2S/PCM
- USB full-speed, 2.0 UAC compliant, asynchronous data transfer
- Asynchronous SRC and sync buffers
- I2C and UART control interface
- SPI Flash interface
- Integrated DC-DC converter for power management
- 7x7mm 60 QFN package, RoHS compliant

### Ordering Information

Ordering Part Number	Part Number	Description	Package	Conditions
CX20921-21Z	CX20921	Dual Mic Far-Field Voice Processor SoC	60 QFN 7x7mm	0 to 70°C
CX20921-99Z	CX20921	Dual Mic Far-Field Voice Processor SoC (Adds extended temperature range support)	60 QFN 7x7mm	-40 to 85°C

The devices in this publication are lead-free (Pb-Free) and China RoHS compliant. 

Contact your local Synaptics sales office for advanced software options.

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