





# Speakers-on-a-Chip with On-chip Voice/Audio DSP, Integrated I<sup>2</sup>S/I<sup>2</sup>C Codec, and Mono Class-D Amplifier CX20707

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Conexant's portfolio includes a comprehensive suite of semiconductor solutions for communications and consumer applications.

The CX20707 is one of Conexant's Speakers-on-a-Chip (SPoC) embedded audio solutions designed for voice communication applications, such as Two-way Intercoms, Security Intercoms, and Doorphone Systems. The device features a proprietary on-chip Digital Signal Processor (DSP), Codec, Mono Class-D Driver, I<sup>2</sup>S and I<sup>2</sup>C interfaces, high performance 24-bit DAC's and ADC's, a range of digital and analog input/output channel selections for flexible routing and mixing, and a mono capless headphone driver in a cost-effective single-chip package. The DSP runs a suite of turnkey audio and voice enhancement algorithms that dramatically improve sound quality. This product is part of the CX2070S SPoC family, which includes CX20702, CX20703, CX20704, CX20705, CX20706 and CX20709.

The device features multiple high performance 24-bit DACs for mono speaker output, multiple 24-bit high performance ADCs supporting mono microphone and mono line input, mono capless headphone output or mono single-ended/ differential line output, support for bi-directional 1<sup>2</sup>S, PCM, S/PDIF-out with independent sampling rates, and a range of digital and analog input/output channel selections for flexible routing and mixing. Different audio sampling rates ranging from 8 kHz to 96 kHz are generated directly from the master clock without the need for external PLL. The mono Class-D amplifier drives a maximum of 2.5 W (average) from the integrated amplifier. The device can be controlled and configured by both read and write capability through I<sup>2</sup>C and Serial Peripheral Interface (SPI), or UART.

The on-chip DSP runs a suite of innovative Conexant proprietary voice processing algorithms and audio post processing effects that that delivers a clear, rich and full sound experience to the end user and frees-up processing power for other applications without compromising on cost and future firmware scalability. Key audio innovations include Subband Acoustic Echo Suppression and Cancellation, Noise Reduction, Subband Line Echo Cancellation, Equalizer, Dynamic Range Compression, and Mic Auto Gain Control. The embedded SPoC Configuration Toolbox allows for fast configuration and performance optimization.

The CX20707 turnkey solution eliminates the need for a multiple-chip reference design, making it easy and economical for manufacturers to design products for high quality intercom applications. A complete evaluation kit with reference board and all the necessary technical documents and software is available.

The SoC is packaged in an environmentally-friendly, RoHS/Green-compliant 76-pin QFN (Quad Flat No leads) package.

# Applications

- Two-way Intercom
- Security Intercom
- Doorphone Systems



# **Distinguishing Features**

- 24-bit DAC/ADC, SNR 102 dB, THD 92 dB at 48 kHz 3.3 V
- Programmable on-chip proprietary DSP
  - Subband acoustic echo suppression and cancellation
  - Noise reduction for inbound speech (far end) and outbound speech (near end)
  - Subband line echo canceller
  - Dynamic loudness adaptor
  - Mic auto gain control
  - Digital equalizer (10 bands/channel)Dynamic range compression
- One 2-wire I<sup>2</sup>C or 4-wire SPI slave, or UART interface for external MCU
- 2.5 W BTL mono Class-D speaker amplifier
- Mono microphone interfaces with on-chip bias supply
- Flexible power management
- Audio sample rate: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, 48, 64, 88.2, 96 kHz

## Part Number CX20707

**Description** Speakers-on-a-Chip with On-chip Voice/Audio DSP, Integrated I<sup>2</sup>S/ I<sup>2</sup>C Codec, and Mono Class-D Amplifier

## CX20707 Features

## CODEC

- 5-wire digital audio I/O (I2S/PCM/SPDIF), supporting full-duplex independent sampling rates
- One 2-wire I<sup>2</sup>C or 4-wire SPI slave interface for external MCU
- UART interface
- Eight GPIO pins
- 2.5 W BTL mono Class-D Speaker Amplifier
- · Single-ended or differential mono analog audio input
- · Mono microphone interfaces with on-chip bias supply
- Integrated 50 mW headphone driver with jack sense
- Single-ended or differential line out
- 24-bit DAC/ADC, SNR 102 dB, THD 92 dB at 48 kHz 3.3 V
- Audio sample rate: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, 48, 64, 88.2, 96 kHz
- 90 dB dynamic range with 0.01percent THD+N at 4  $\Omega$  load
- Spread Spectrum for filter-less, low EMI output
- 10-bit ADC multiplexed to support analog volume potentiometer and DC level detection

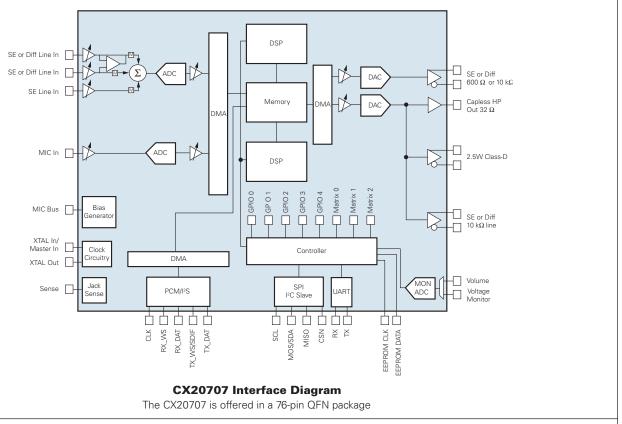
- Flexible power management
- Variable master clock rates

#### DSP

- Subband acoustic echo suppression and cancellation
- Noise reduction for inbound speech (far end) and outbound speech (near end)
- Dynamic loudness adaptor
- Mic auto gain control
- Digital parametric equalizer (10 bands/channel)
- Dynamic range compression

#### **SPoC Configuration Toolbox**

- Fast configuration tool via USB-to- $I^2C$  from PC
- Device configuration and DSP parameter adjustment
- Output log for convenient MCU programming



#### **Conexant Product Portfolio**

Conexant's comprehensive product portfolio includes solutions for imaging, audio, embedded modem and video surveillance applications.

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