CONEXANT

Speakers-on-a-Chip with On-Chip Voice/Audio DSP, Integrated I^2S/I^2C Codec, and PWM Class-D Amplifier

CX20703

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

The CX20703 is one of Conexant's Speakers-on-a-Chip (SPoC) solutions with the proprietary on-chip Digital Signal Processor (DSP), Codec, Class-D/PWM (Pulse-Width Modulator) driver, and I^2S and I^2C interfaces in a cost-effective single-chip package. The solution features a suite of turnkey audio and voice enhancement algorithms designed for applications such as Mobile Internet Device, Multimedia IP Phone, Portable Navigation Device, Portable Media Player, and Intercom Systems.

The CX20703 offers multiple digital data and control I/O for flexible peripheral or MCU/MPU connectivity. The device features one 4-wire and one 5-wire digital audio interface that can be mixed or multiplexed to support dual bi-directional I^2S, Pulse Code Modulation (PCM), S/PDIF-out with independent sampling rates. The device can be controlled and configured by both read and write capability through I^2C and Serial Peripheral Interface (SPI).

The device integrates three high-performance 102 dB SNR, 24 bit DACs for stereo speaker output, capless headphone output, and single-ended/differential line-output. The analog input paths feature four high-performance 24-bit ADCs supporting mono or array-microphones, and Auxiliary stereo line-inputs. 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 power-efficient, Class-D PWM output supports an external amplifier to drive large speakers and offers the option to drive maximum of 2.5 W from the integrated stereo amplifier.

The CX20703 operates at supply voltages down to 3.3 V for analog and 1.8 V for the digital core. An advanced power management scheme can be configured to achieve <5 mW in stand-by mode or <1 mW in deep sleep mode.

The on-chip DSP hardware runs a suite of innovative Conexant proprietary voice processing algorithms and audio post processing effects that dramatically improves sound quality and frees-up processing power for other applications without compromising on cost and future firmware scalability. Conexant's acoustic echo cancellation, noise reduction, beam-forming, line echo cancellation, dynamic range compression, digital equalizer, and 3D effects deliver a clear, rich and full sound experience to the end user. The embedded SPoC Configuration Toolbox allows designers to quickly adjust and optimize audio performance on the target system.

The CX20703 eliminates the need for a mulitiple chip reference design, making it easy and economical for maufacturers to design products for high quality audio and voice applications.

Applications

- Mobile Internet Device
- Multimedia IP phone
- Portable Navigation Device
- Portable Media Player
- Intercom Systems

Distinguishing Features

- 24-bit DAC/ADC, SNR 102 dB, THD - 92 dB at 48 kHz 3.3 V
- Configurable on-chip proprietary DSP
  - Subband acoustic echo suppression and cancellation
  - Subband line echo cancellation
  - Array mic beam-forming
  - Noise reduction
  - Dynamic loudness adaptor
  - Mic auto gain control
  - Digital parametric equalizer (10 bands/ channel)
  - Dynamic range compression
  - 3D Expander (Phantom mode and Immersion mode)
- 4-wire and 5-wire digital audio I/O (I^2S/PCM/ SPDIF), supporting full duplex independent sampling rates
- One 3-wire I^2C or 4-wire SPI slave interface for external MCU
- 2.5 W x 2 BTL stereo Class-D speaker amplifier, also configurable as a PWM
- 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 CX20703

Description Speakers-on-a-Chip Voice/Audio DSP, Integrated I^2S/I^2C Codec, and PWM Class-D Amplifier

CX20703 Features

CODEC

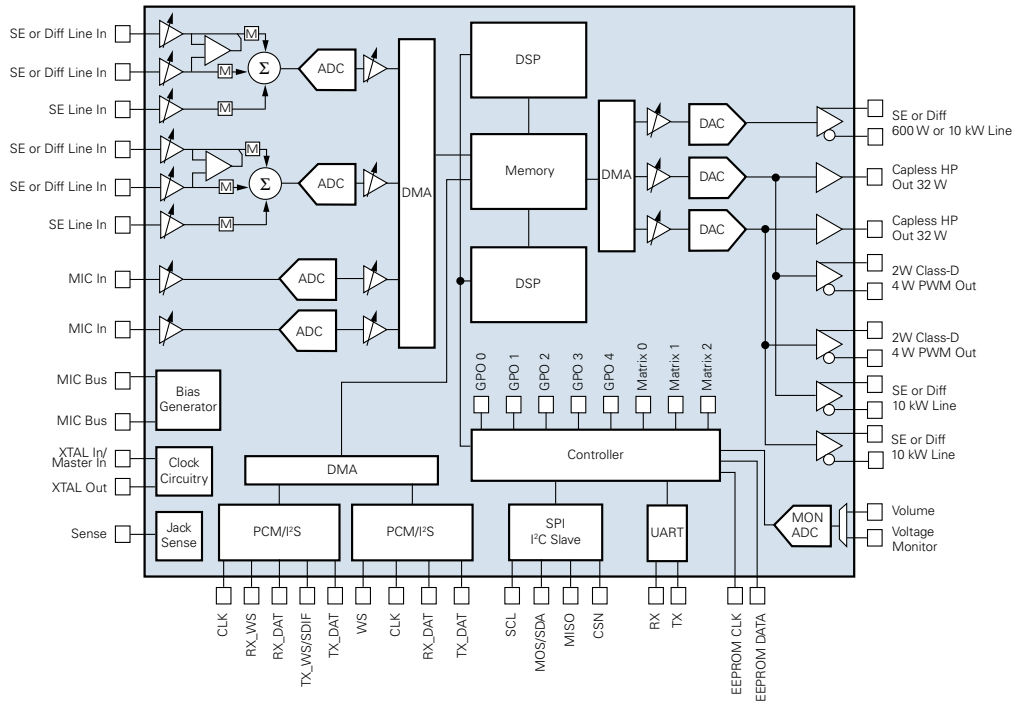
- 4-wire and 5-wire digital audio I/O (I^2S/PCM/SPDIF), supporting full duplex independent sampling rates
- One 3-wire I^2C or 4-wire SPI slave interface for external MCU
- Eight GPIO pins
- 2.5 W x 2 BTL stereo Class-D speaker amplifier, also configurable as a PWM
- Output for external feedback-less type Class-D amplifier
- Spread Spectrum for filter-less, low EMI output
- Up to three single-ended line in (convertible to one stereo differential line in and one single-end)
- Two microphones interfaces with on-chip bias supply
- Integrated 50 mW headphone driver with jack sense
- 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 0.01 percent THD+N at 4 Ω load
- 10-bit ADC multiplexed to support analog volume potentiometer and DC level detection
- Flexible power management
- Variable master clock rates
  - 7 mW stereo playback (1.8 V supply)
  - 14 mW record and playback (1.8 V supply)

DSP

- Subband acoustic echo suppression and cancellation
- Subband line echo cancellation
- Array mic beam-forming
- Noise reduction
- Dynamic loudness adaptor
- Mic auto gain control
- Digital parametric equalizer (10 bands/channel)
- Dynamic range compression
- 3D Expander (Phantom mode and Immersion mode)

Configuration Tool

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



CX20703 Interface Diagram

The CX20703 is offered in a 76-pin QFN package and is compatible with Conexant's CX20709 SPoC

Conexant Product Portfolio

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

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