CX20741/45 I²S Audio Codec with 2W Class-D, Capless HP, and Digital Microphone

Features

- 2 pairs of independent DACs and 3 pairs of independent ADCs
- Sampling rates include 16-bit, 44.1 kHz to 24-bit, 192 kHz for DACs, and from 16-bit, 44.1 kHz to 24-bit; 96 kHz for ADCs.
- Integrated 2 WRMS (per channel) class-D stereo speaker amplifier
- Capless headphone eliminates BOM
- Dedicated Line Output
- Multiple input/output retaskable ports
- Stereo Digital Microphone interface
- Integrated boost for all microphones
- Two independent SPDIF outputs
- Integrated regulators maximize performance
- Microphone Security Control
- Integrated headphone limiter (GS Mark)
- D-Flex Power Management
- Wake on PC BEEP
- PopShield eliminates pops and clicks
- Fidelity exceeds Microsoft WHCK requirements
- Jack sense detects up to 8 jacks
- Digital Mixer
- Compliant with all Intel High Definition Audio Specifications
- Selectable 1.5V/3.3 V link signaling
- Available in 48-/56-QFN and in 48-/64-QFP packages

Software

- Linux
- Android 3.x/4.x
- DSP Plug-ins
- Voice input processing

Applications

- Tablets
- Portable Media Players
- Smartphones
- Digital Docking Stations

Overview

The CX20741/45 are I²S audio codecs with integrated stereo Class-D speaker amplifiers, capless headphone amplifiers and provides 98 dB dynamic range. The CX20745 supports the Industrial temperature range while the CX20741 supports the Commercial temperature range.

The integrated filter-less Class-D stereo amplifier with Spread Spectrum EMI dispersion technology is capable of driving up to 2W RMS per channel into 4 Ω speakers. Built-in, fully configurable hardware EQ and Dynamic Range Compression improve frequency response, maximize output volume, and get maximum audio performance from integrated speakers while remaining independent of driver and OS.

A stereo pair of capless headphone drivers includes integrated short circuit protection and auto-recovery. These high performance headphone drivers save cost by eliminating external headphone amplifiers and DC blocking capacitors. The capless architecture outputs a full-range frequency response of 98 dB or better. Both Apple and Nokia style headsets are supported as well inline command sensing for headset button controls.

One single-ended analog line output can be used to drive powered speakers or external devices. One stereo differential Microphone/Line In port is available and it is re-taskable to single-ended. Programmable microphone boost and bias is provided. Local analog loopbacks with EQ/DR from Line or Microphone inputs to the outputs can be configured.

A digital microphone interface allows interfacing to two digital microphones. That interface includes a hardware DC-level filter that eliminates problems caused by digital microphones with DC offset with programmable clock outputs. Hardware Automatic Gain Control (AGC) is available for all microphone paths to normalize the capture levels in real time. The digital I/Os, I²C and I²S interfaces support a wide range of and all run at 3.3V. The Hardware Digital Volume Control supports up-down buttons as well as an infinity volume control knob commonly found in high-end AV equipment.

Two integrated Low Dropout Regulators (LDOs) generate the internal clean power rails needed for analog and digital. All output ports feature PopShield circuitry that eliminates pops and clicks. Jack sensing is available that can detect up to four jacks with programmable switch de-bounce times.

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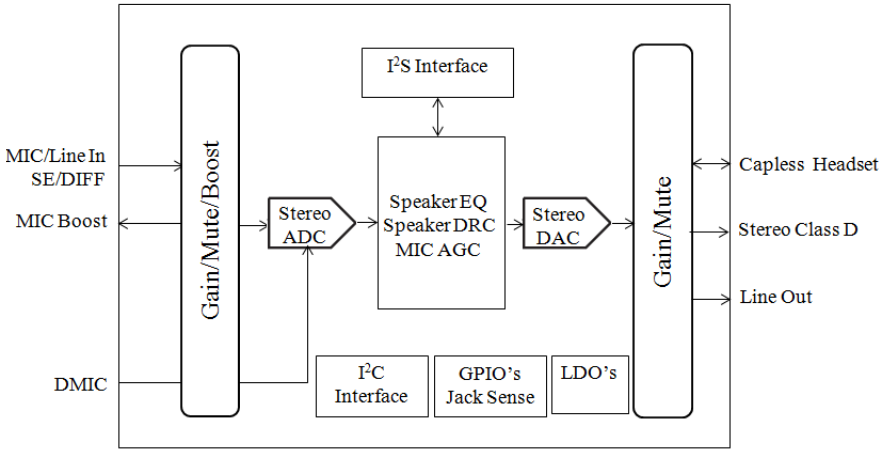
Block Diagram



Part Number CX20741/45

Description I²S Audio Codec

Analog Performance Characteristics

Parameter	Minimum	Nominal	Maximum	Unit	Comments
Microphone/Line In					
Gain	0		40	dB	In steps of 10 dB
Full scale input signal		1		Vrms	ac-coupled
Dynamic Range[1]		87		dBFS	A-weighted, 20 to 20 kHz
THD+N at -3 dB FS		-80		dBFS	20 to 20 kHz
Input resistance	5		15	kΩ	15 kΩ with 0 dB gain, 5 kΩ otherwise
Class-D					
Power			2 W		5 V mode: Up to 2 W/ch 4 Ω when headphone is not in use Up to 1.5 W/ch 4 Ω when headphone is in use 3 V mode: Up to 1 W/ch 4 Ω
Output load		4		Ω	
Dynamic Range	75	85	90	dBFS	A-weighted, 20 to 20kHz
THD+N at -3 dB FS		-65		dBFS	20 to 20 kHz into 4 Ω
Line Output					
Full scale output signal		1		Vrms	AC-coupled
Output load	10			kΩ	
Dynamic Range		98		dBFS	A-weighted, 20 to 20 kHz
THD+N at -3 dB FS		-85		dBFS	20 to 20 kHz into 10 kΩ load
Crosstalk		-70		dB	
Headphone Output					
Full scale output signal		1.0		Vrms	
Output offset	-8	0	8	mV	Reduces to ± 250 µV with offset cancellation
Output load	16	32		Ω	Can drive -3 dBFS into 16 Ω without clipping.
Dynamic Range	95			dBFS	A-weighted, 20 to 20 kHz
THD+N at -3 dB FS			-85	dBFS	20 to 20 kHz into 10 kΩ load
Crosstalk			-70	dB	

Ordering Information

Model Number	Package	Description
CX20745-11Z*	48-Pin QFN	Industrial Temperature Range, –40 °C to +85 °C
CX20741-11Z*	48-Pin QFN	Commercial Temperature Range, 0 °C to +70 °C
*Lead-free (Pb Free) and RoHS compliant		

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