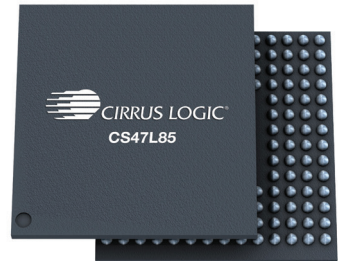# CS47L85

Low Power Smart Codec with Seven DSP Cores, Voice and Media Enhancement, and Integrated Sensor Hub

Featuring SoundClear® Software for Mobile Applications

CIRRUS LOGIC®

Product Overview

Cirrus Logic has combined an advanced DSP feature set with a highly integrated audio codec to create a next generation "smart audio hub" that delivers an enhanced voice and audio experience for smartphones and tablets. The CS47L85 features a 900 MIPS multi-core audio signal processor and a high performance 6/8 channel 24-bit high-fidelity codec embedded with SoundClear® software technology to support multiple concurrent audio functions including multi-microphone wideband noise reduction, acoustic echo cancelation (AEC), stereo ambient noise cancelation (ANC) and speed and media enhancement.

The CS47L85 is designed with three stereo, multi-purpose headphone output drivers each with stereo ground-reference or mono BTL outputs, 120dB SNR and noise levels as low as 2µVRMS for high-fidelity quality headphone output, plus two stereo Class D speaker output drivers and a four-channel digital speaker interface. Programmable wideband, multi-microphone processing is standard with the device's nine analog inputs and up to 12 PDM digital inputs, along with single-ended or differential mic/line inputs. A flexible control interface with sensor and accessory support can be configured for functions up to 40 GPIO pins — one I2C slave or two SPI slave interfaces, plus three I2P master interfaces.

With its ability to host a full suite of Cirrus Logic's SoundClear software technology, the CS47L85 provides far reaching opportunities for product differentiation. SoundClear Control provides "always on, always listening" multi-trigger word detection without keeping the applications processor awake to conserve standby-mode power. SoundClear Sense supports applications that increase contextual awareness, including advanced motion sensing and pedestrian navigation functionality.

Available Software Features*

Communications VOICE	SoundClear Voice • Up to 16 kHz processing • Up to 3-mic handset or speakerphone Tx NR & AEC • Speaker protection • Wind noise reduction	Make/receive calls with optimized voice quality based on use cases from a smartphone or tablet
Convenience CONTROL	SoundClear Control • Multi-trigger word detection • User defined trigger word detection • Extended audio buffer • Two-channel input, output	"Always on" listening with minimal power consumption range
Capture CAPTURE	SoundClear Record • Up to 48 kHz processing • 2~4 Concurrent MIC input processing • Wind/mic/focus/background noise reduction	Capture noise-free audio when and where needed
Content PLAYBACK	SoundClear Playback • Master Hi-Fi • Speaker protection • Multi-band compressor • Stereo ANC	Enjoy 192k, 24-bit high resolution audio playback; support for branded third party algorithms
Contextual Awareness SENSE	SoundClear Sense • Proof of sensor fusion capability	

*Software features and pricing vary based on specific use application. Contact a local Cirrus Logic sales representative for further information.

Target Applications

The CS47L85 is targeted at mobile and portable applications, including smartphones, tablets and multimedia handsets.

System Features

900 MIPS, 900 MMAC multi-core DSP

- Enhanced DRE processing for 121 dB SNR
- Fixed function signal-processing
  - Dynamic range control, fully parametric EQs
  - Tone, noise, PWM, haptic control signal generators
- Multi-channel asynchronous sample-rate conversion

Integrated multi-channel 24-bit hi-fi audio hub codec

- 121-dB SNR headphone playback (48 kHz)
- Event time stamp function
- Eight general purpose timers, including WDT functions

Four digital microphone inputs (two stereo interfaces)

Stereo headphone/earpiece/line output driver

- 33 mW into 32Ω load at 1% THD+N

Two 2 W Class D speaker output drivers

Four full digital audio interfaces

- Standard sample rates from 8 kHz up to 192 kHz
- TDM support on all AIFs
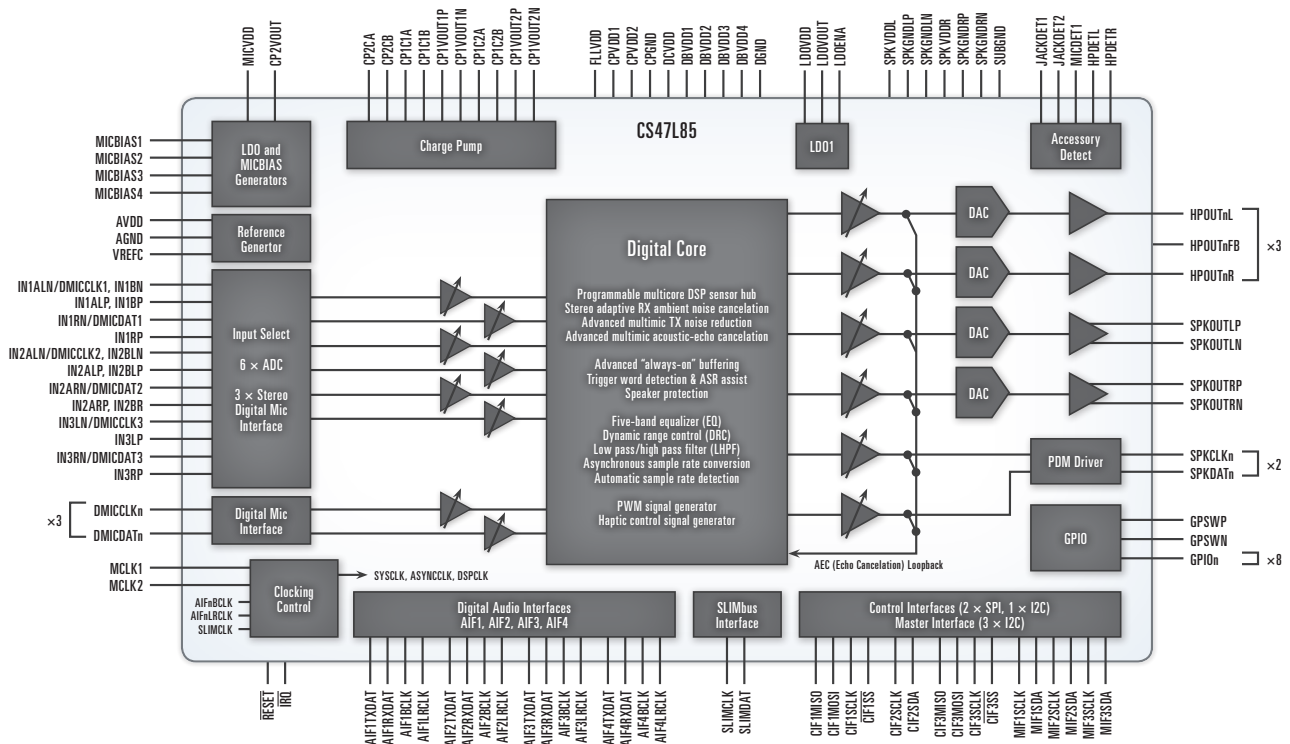
Flexible clocking, derived from MCLKn or AIFn

- Three low power, frequency locked loops (FLLs) to support reference clocks down to 32 kHz
- Ultra low power consumption for "always on" functions

Advanced accessory detection functions

- Low power standby-mode and configurable "wake up"

Compact WCSP package with 0.4 mm, 176-ball array

Block Diagram Schematic

MAY2015