

# CS47L85

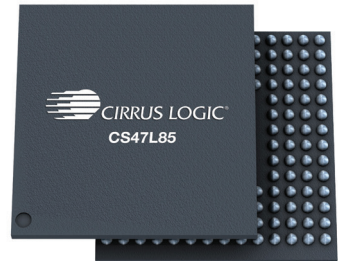
Low Power Smart Codec with Seven DSP Cores, Voice and Media Enhancement, and Integrated Sensor Hub

Featuring SoundClear® Software for Mobile Applications



## 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 cancellation (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\*

<b>Communications</b>  VOICE	SoundClear Voice <ul style="list-style-type: none"><li>• Up to 16 kHz processing</li><li>• Up to 3-mic handset or speakerphone Tx NR &amp; AEC</li><li>• Speaker protection</li><li>• Wind noise reduction</li></ul>	Make/receive calls with optimized voice quality based on use cases from a smartphone or tablet
<b>Convenience</b>  CONTROL	SoundClear Control <ul style="list-style-type: none"><li>• Multi-trigger word detection</li><li>• User defined trigger word detection</li><li>• Extended audio buffer</li><li>• Two-channel input, output</li></ul>	“Always on” listening with minimal power consumption range
<b>Capture</b>  CAPTURE	SoundClear Record <ul style="list-style-type: none"><li>• Up to 48 kHz processing</li><li>• 2-4 Concurrent MIC input processing</li><li>• Wind/mic/focus/background noise reduction</li></ul>	Capture noise-free audio when and where needed
<b>Content</b>  PLAYBACK	SoundClear Playback <ul style="list-style-type: none"><li>• Master Hi-Fi</li><li>• Speaker protection</li><li>• Multi-band compressor</li><li>• Stereo ANC</li></ul>	Enjoy 192k, 24-bit high resolution audio playback; support for branded third party algorithms
<b>Contextual Awareness</b>  SENSE	SoundClear Sense <ul style="list-style-type: none"><li>• Proof of sensor fusion capability</li></ul>	

\*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

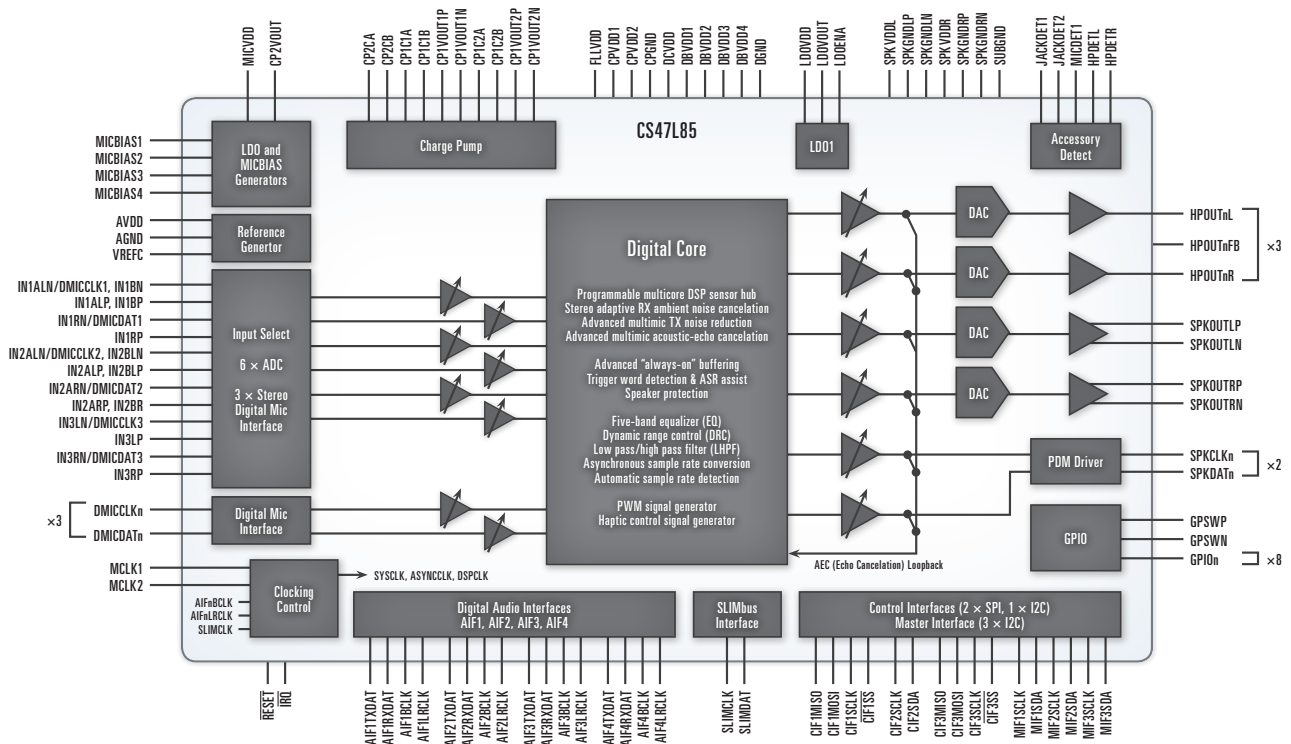
- Three low power, frequency locked loops (FLLs) to support reference clocks down to 32 kHz
- Ultra low power consumption for “always on” functions

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



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