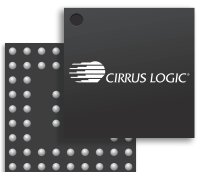




Product Summary Guide



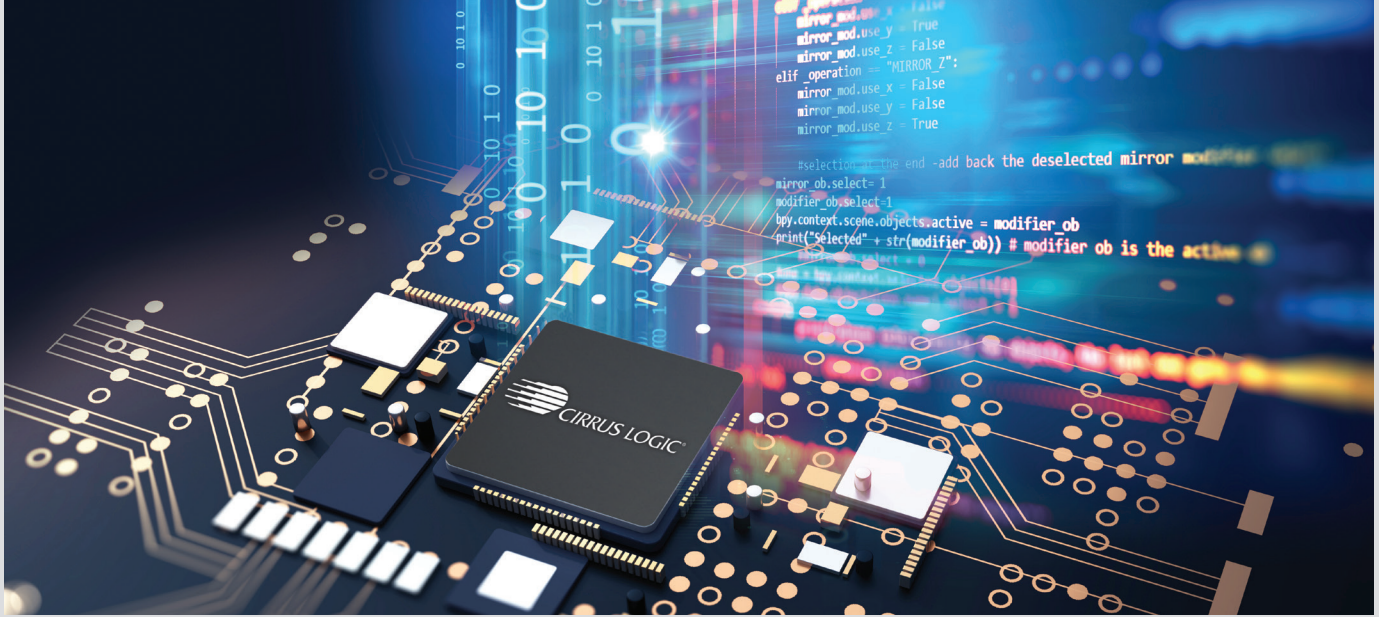
Experts in Low-Power Audio and High-Performance Mixed-Signal Processing

Cirrus Logic Product Summary Guide

Experts in Low-Power Audio and High-Performance Mixed-Signal Processing

Cirrus Logic provides low-power, high-performance mixed-signal processing solutions that create innovative user experiences for the world's top mobile and consumer applications. With a strong intellectual property portfolio and extensive mixed-signal expertise, Cirrus Logic is uniquely positioned to drive innovation and increase demand for products that elevate how consumers interact with their electronic devices.





World-Class Hardware and Software

Mixed-signal innovation has been our lifeblood for nearly four decades. Our global workforce drives a culture of innovation, evidenced by an intellectual property portfolio of more than 3,400 patents focused on solving complex technical challenges that deliver advanced features for the world’s leading electronic device OEMs. Cirrus Logic’s world-class, low-power audio and high-performance mixed-signal products bridge the analog world around us with today’s modern digital products. Our audio converters have set industry benchmarks for low power while providing high-fidelity playback. Through advanced software algorithms, our boosted amplifiers deliver an audio experience that balances ultra-low power consumption and maximum loudness with the highest-quality sound. By leveraging our expertise in voice-related software technology, our smart codecs deliver enhanced performance for high-quality phone conversations and smart home voice commands. Through sophisticated low-latency performance and high signal-to-noise ratio haptic technology, Cirrus Logic haptic driver and sensing ICs enable sleeker, more robust consumer devices for highly responsive and consistent tactile feedback for immersive human-to-machine experiences.



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Audio and Voice Components

Cirrus Logic's analog and mixed-signal converter technologies, processors and smart codecs are featured in the most recognized mobile, consumer, professional and voice applications. Cirrus Logic products drive innovation in popular applications such as smartphones, tablets, home theater systems, Bluetooth speakers, headphones, gaming systems, laptops and interactive smart home applications. The company's reputation for superior, best-in-class audio components, along with our sophisticated voice-processing software technology, provides a compelling value proposition for our customers.

Audio DSPs

CS48L10*
CS48L11*
CS48L32
CS495314*
CS497014*
CS497024*
CS49834
CS49844

Audio A/D Converters

CS5340
CS5341
CS5342
CS5343
CS5344
CS5346
CS5351*
CS5361
CS5364
CS5366
CS5368
CS5381
CS53L21
CS53L30

Audio D/A Converters

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CS43198
CS4334/35/38/39
CS4344/45/48
CS4349
CS4350
CS4354
CS4361
CS4362A/82A
CS4365/85
CS4385A
CS4398
CS4399
CS43L21
CS43L22
CS43L36

WM8523

WM8524

WM8716

WM8740

WM8761

WM8918

Smart Codecs

CS42L92
CS47024*
CS47028*
CS47048*
CS47L15*
CS47L24
CS47L35
CS47L85*
CS47L90
CS48L32
WM8281

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CS42L42
CS42L51
CS42L52
CS42L73*
WM8904
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WM8998

*NRND

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WM9081

Boosted Audio Amplifiers

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CS3310

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WM8234
WM8235
WM8255

Audio DSPs

Part Number	Processor	Key Features & Firmware	DSP Core Speed	Operating Range	Package
CS48Lxx	Ultra low power Audio DSP subsystem.				
CS48L10* SOUND ^{CLEAR}	Single 32-bit	MP3, WMA, Pro Logic II X, Dolby Headphone II, Dolby Virtual Speaker II, DTS Neo X, DTS WOW HDX, Audyssey DSX, Dolby Volume	1.0 V 80 MHz 1.2 V 130 MHz	0 to 70 °C	24 QFN 20 WLCSP
			1.0 V 80 MHz 1.2 V 130 MHz	–40 to 105 °C	
CS48L11* SOUND ^{CLEAR}	Single 32-bit	MP3, WMA, Dolby Digital, Pro Logic II X, Dolby Headphone II, Dolby Virtual Speaker II, DTS Neo X, DTS WOW HDX, Audyssey DSX, DTS SS HD, DTS SS II Stereo, Dolby Volume	1.0 V 80 MHz 1.2 V 150 MHz	0 to 70 °C	24 QFN
			1.0 V 80 MHz 1.2 V 150 MHz	–40 to 105 °C	
CS48L32	Single 32-bit	Programmable HaloCore™ provides platform for low power input voice processing; up to 4 analog or 4 digital mic inputs; supports concurrent audio features including voice-trigger detection, noise reduction, media enhancement plus additional 3rd party algorithms	100 MHz (dual MAC)	–40 to 85 °C	64 WLCSP, 64 QFN
CS495314*	Dual 32-bit	(DD, DDEX, DTS, DTSES, DTS96, AAC) + PP2	150 MHz (600 M MAC/Sec)	0 to 70 °C	128 LQFP
			131 MHz (600 M MAC/Sec)	–40 to 85 °C	
CS4970xx	Single chip multistandard surround sound decoder targeted for playback from HD DVD™, Blu-ray Disc® players, and all analog, S/PDIF and HDMI® sources.				
CS497014*	Dual 32-bit	(DD+, DTHD, DD, DDEX, AAC) + PP2	150 MHz (600 M MAC/Sec)	0 to 70 °C	128 LQFP
			131 MHz (600 M MAC/Sec)	–40 to 85 °C	
CS497024*	Dual 32-bit	(DTS, DTS-ES, DTS96/24, DTS-HD, DD+, DTHD, DD, DDEX, AAC) + PP2	150 MHz (600 M MAC/Sec)	0 to 70 °C	128 LQFP
			131 MHz (600 M MAC/Sec)	–40 to 105 °C	
CS498xx	Multi-core DSP for advanced audio processing and decoding.				
CS49834 SOUND ^{CLEAR}	Triple 32-bit	Decode (Dolby, DTS), Enhance (Dolby, DTS, Audyssey), Post-Process (Dolby, DTS, Audyssey, THX)	300MHz	0 to 70 °C	144 LQFP
CS49844 SOUND ^{CLEAR}	Quad 32-bit	Decode (Dolby ATMOS, DTS UHD), Enhance (Dolby, DTS, Audyssey), Post-Process (Dolby, DTS, Audyssey, THX)	300MHz	0 to 70 °C	144 LQFP

*NRND

Audio A/D Converters

Part Number	Channels	Resolution (bits)	Dynamic Range (dB)	THD+N (dB)	Sample Rate (kHz)	Analog Inputs	Power Supply (V)	Comments	Package
CS5340	2	24	101	−94	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Pin compatible with CS5341	16 TSSOP
CS5341	2	24	105	−98	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Pin compatible with CS5340	16 TSSOP
CS5342	2	24	105	−98	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 2.5 to 5	384*Fs MCLK	16 TSSOP
CS5343	2	24	98	−92	96	Single-ended	VA = 3.3 or 5	I ² S	10 TSSOP
CS5344	2	24	98	−92	96	Single-ended	VA = 3.3 or 5	LJ	10 TSSOP
CS5346	6	24	103	−95	192	Single-ended	VA = 5 VD = 3.3 VL = 3.3 to 5	6:1 input MUX, PGA, MIC pre-amp, high input impedance	48 LQFP
CS5351*	2	24	108	−98	192	Single-ended	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Functionally compatible with CS5361	24 SOIC 24 TSSOP
CS5361	2	24	114	−105	192	Differential	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Pin compatible with CS5381	24 SOIC 24 TSSOP
CS5364	4	24	114	−105	192	Differential	VA = 5 VD = 3.3 or 5 VLS/VLC = 1.8 to 5	TDM interface, on-chip oscillator	48 LQFP
CS5366	6	24	114	−105	192	Differential	VA = 5 VD = 3.3 or 5 VLS/VLC = 1.8 to 5	TDM interface, on-chip oscillator	48 LQFP
CS5368	8	24	114	−105	192	Differential	VA = 5 VD = 3.3 or 5 VLS/VLC = 1.8 to 5	TDM interface, on-chip oscillator	48 LQFP
CS5381	2	24	120	−110	192	Differential	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Flagship performance	24 SOIC 24 TSSOP
CS53L21	2	24	98	−88	96	Single-ended	VA = 1.8 to 2.5 VD = 1.8 to 2.5 VL = 1.8 to 3.3	ADC MUX, PGA, MIC pre-amp	32 QFN
CS53L30	4	24	91	−84	8 – 48	Single-ended Differential	VP = 3 to 5 VA = 1.8	TDM interface, < 2.5 mW, mono analog MIC record, 4x MIC-bias	30 WLCSP 32 QFN

*NRND

Audio D/A Converters

Part Number	Channels	Resolution (bits)	Dynamic Range (dB)	THD+N (dB)	Sample Rate (kHz)	Analog Outputs	Power Supply (V)	Output Level (V _{RMS})	Comments	Package
CS43131	2	32	130	-115	384	Pseudo-Differential	VA = 1.8 VD = 1.8	2		40 QFN 42 WLCSP
CS43198	2	32	130	-115	384	Pseudo-Differential	VA = 1.8 VD = 1.8	2		40 QFN 42 WLCSP
CS4334/35/ 38/39	2	24	96	-88	96	Single-ended	VA = 5	1.2	Entry-level stereo DAC	8 SOIC
CS4344/45/48	2	24	105	-90	192	Single-ended	VA = 3.3 or 5	1.1	Upgrade for CS4340 and CS4340A	10 TSSOP
CS4349	2	24	101	-91	192	Single-ended	VA = 3.3 or 5	1	Volume control	24 TSSOP
CS4350	2	24	109	-91	192	Single-ended Differential	VA = 3.3 or 5 VLC = 3.3 to 5 VLS = 1.5 to 5	2	Integrated PLL, TDM interface	24 TSSOP
CS4354	2	24	101	-86	192	Single-ended	VA/VD = 5.0 VL = 1.5 to 5.0	2	Line-level driver	14 SOIC
CS4361	6	24	105	-95	192	Single-ended	VA = 5 VL = 1.8 to 5	1.1	Entry-level DAC	20 TSSOP
CS4362A/82A	6/8	24	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	2.3	DSD	48 LQFP
CS4365/85	6/8	24	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	2.5	DSD, TDM interface	48 LQFP
CS4385A	8	24	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	2.3	DSD, TDM interface. Access to TDM through hardware mode with a wider range of TDM timings.	48 LQFP
CS4398	2	24	120	-107	192	Differential	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	2.3	Flagship DAC, DSD processor, selectable D-filter	28 QFN 28 TSSOP
CS4399	2	16	96	-88	2-100	Low Pass Filter	VA = 5	1.2		WLCSP
CS43L21	2	24	98	-86	96	Single-ended	VA = 1.8 to 2.5 VD = 1.8 to 2.5 VL = 1.8 to 3.3	1.3	HP amp, volume control	32 QFN
CS43L22	2	24	98	-88	96	Single-ended	VA = 1.65 to 2.83 VD = 1.65 to 2.83 VP = 2.37 to 5.35 VL = 1.8 to 3.3	1.3	HP amp, Class-D speaker amp	40 QFN
CS43L36	2	32	114	-98	8-192		VA = 1.8 VD = 1.1 - 1.94	1		40 QFN 49 WLCSP
WM8523	2	24	106	-93	192	Single-ended	VA = 3 to 3.6 VD = 3 to 3.6	2	Digital volume control, HW and 2/3-wire SW control	20 TSSOP
WM8524	2	24	106	-93	192	Single-ended	VA = 3 to 3.6 VD = 3 to 3.6	2.1	HW control	16 TSSOP
WM8716	2	24	112	-97	192	Single-ended	VA = 3 to 5.5 VD = 3 to 5.5	1.1	Selectable digital filter response, HW and 3-wire SW control	28 SSOP
WM8740	6	24	117	-104	8-192	Single-Ended	VA = 3.5 to 5.0 VD = 3.0 to 5.5	2		28 SSOP
WM8761	2	24	100	-90	192	Single-ended	VA = 2.7 to 5.5 VD = 2.7 to 5.5	1	HW control	14 SOIC
WM8918	2	24	96	-86	8 - 96	Single-ended	VA = 1.71 to 2.0 VD = 1.42 to 3.6	1	5 band EQ, DRC, digital MIC interface, HP driver, FLL	32 QFN

Smart Codecs

Part Number	DACs / ADCs	DAC Dynamic Range (dB)	DAC THD+N (dB)	ADC Dynamic Range (dB)	ADC THD+N (dB)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	DSP and Other Features	Package
CS42L92	4 / 4	115	-100	98	-88	0-384	Differential	VA = 1.8 VD = 1.2	Integrated DSP provides general purpose signal processing capability	104 WLCSP
CS47024*	4 / 2	108	-98	105	-98	96	Differential	VA = 3.3 VD = 1.8	Single 32-bit DSP core, 150 MIPS, 5:1 MUX on ADC, clock PLL, 2ch hardware SRC, S/PDIF Tx	100 LQFP
CS47028*	8 / 2	108	-98	105	-98	96	Differential	VA = 3.3 VD = 1.8	Single 32-bit DSP core, 150 MIPS, 5:1 MUX on ADC, clock PLL, 8ch hardware SRC, S/PDIF Rx/Tx	100 LQFP
CS47048*	8 / 4	108	-98	105	-98	96	Differential	VA = 3.3 VD = 1.8	Single 32-bit DSP core, 150 MIPS, 5:1 MUX on one 2ch ADC, clock PLL, 8ch hardware SRC, S/PDIF Rx/Tx	100 LQFP
CS47L15*	3 / 2	115	-92	98	-88	8-192	Single-Ended; Differential	VA = 1.8 VD = 1.2	150 MIPS, 150 MMAC audio DSP; up to 4 analog or 4 digital mic inputs; 3 full digital audio interfaces	70 WLCSP
CS47L24	3 / 0	115	-92			8-192	Single-Ended; Differential	VA = 1.8 VD = 1.2 to 1.8	300 MIPS, 300 MMAC dual-core audio DSP; 4 digital mic inputs; stereo headphone/earpiece/line output driver; mono 2 W Class D speaker output driver	63 WLCSP
CS47L35	3 / 4	115	-93		-86	8-192	Single-Ended; Differential	VA = 1.8 VD = 1.2 to 1.8	450 MIPS, 450 MMAC multi-core audio DSP; 100 dB SNR mic input; 122 dB SNR headphone playback	101 WLCSP
CS47L85*	8 / 6	115	-91		-88	8-192	Single-Ended; Differential	VA = 1.2 to 1.8 VD = 1.2; 1.8 to 3.6	900 MIPS, 900 MMAC multi-core audio DSP; 3 stereo headphone/earpiece/line output drivers	176 WLCSP
CS47L90	6 / 4	115	-93		-88	0-192	Single-Ended; Differential	VA = 1.8 VD = 1.2	975 MIPS, seven core audio DSP; up to 7 analog or 10 digital mic inputs	173 WLCSP
CS48L32	0/2	N/A	N/A	104	-88	8-192	Differential	VA = 1.8 VD = 1.2	Programmable HaloCore™ provides platform for low power input voice processing	64 WLCSP, 64 QFN
WM8281 SOUND CLEAR	8 / 6	121	-92	100	-89	192	Single-ended Differential	VA = 1.7 to 5.5 VD = 1.14 to 1.9	Multi-core DSP, 600 MIPS, 600 MMC, programmable wideband, multi-mic audio processing, ASRC, haptic control signal generator, SLIMbus interface, PDM interface, 3x digital audio interface, HP/speaker amps, dual FLL	138 WLCSP

Portable Codecs

Part Number	DACs / ADCs	DAC Dynamic Range (dB)	DAC THD+N (dB)	ADC Dynamic Range (dB)	ADC THD+N (dB)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS42L42	2 / 1	114	-90	114	-85	8-192	Pseudo-Differential	VA = 1.8		49 WLCSP 48 QFN
CS42L51	2 / 2	98	-86	96	-88	96	Single-ended	VA = 1.8 to 2.5 VD = 1.8 to 2.5 VL = 1.8 to 3.3	3:1 MUX, PGA, MIC pre-amp, HP amp	32 QFN
CS42L52	2 / 2	98	-86	98	-88	96	Single-ended	VA = 1.65 to 2.83 VD = 1.65 to 2.83 VP = 2.37 to 5.35 VL = 1.8 to 3.3	4:1 MUX, PGA, MIC, pre-amp, HP/speaker amps	40 QFN
CS42L73*	4 / 2	97	-85	91	-85	48	Pseudo-Differential	VA = 1.66 to 1.94 VD = 0.85 to 1.40 VP = 3.0 to 5.25 VCP = 1.66 to 1.94 VL = 1.66 to 1.94	Class-H HP amp, Class A/B speaker amp, 3x asynchronous serial ports	60 WLCSP 65 BGA
WM8904	2 / 2	96	-86	92	-80	96	Single-ended Differential	VA = 1.71 to 2 VD = 0.95 to 3.6	ReTune™ Mobile parametric EQ, dynamic range controller, DMIC interface, HP amp, FLL	32 QFN 36 WLCSP
WM8958	4 / 2	100	-83	94	-84	96	Single-ended Differential	VA = 1.71 to 5.5 VD = 1.0 to 3.6	ReTune™ Mobile, MBC, parametric EQ, dynamic range controller, ASRC, 4x DMIC interface, HP/speaker amps, dual FLL	72 WLCSP
WM8998	7 / 3	122	-89	96	-88	192	Single-ended Differential	VA = 1.7 to 5.5 VD = 1.14 to 3.74	Wind noise reduction, Dynamic range control, Parametric EQ, DSP filters, ASRC, SLIMbus interface, 3x digital audio interface, dual FLL	117 WLCSP

*NRND

Mono/Stereo Codecs

Part Number	Channels	DAC Dynamic Range (dB)	DAC THD+N (dB)	ADC Dynamic Range (dB)	ADC THD+N (dB)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS4245	6 in, 2 out	104	-90	104	-95	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	6:1 input MUX, MIC pre-amp, PGA	48 LQFP
CS4265	2 in, 2 out	104	-90	104	-95	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	2:1 input MUX, MIC pre-amp, PGA, S/PDIF Tx	32 QFN
CS4270	2 in, 2 out	105	-95	105	-95	192	Single-ended	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Volume control, passive filters, 3.3 V operation	24 TSSOP
CS4271	2 in, 2 out	114	-100	108	-98	192	Single-ended ADC Differential DAC	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Volume control, on-chip oscillator	28 TSSOP
CS4272	2 in, 2 out	114	-100	114	-100	192	Differential	VA = 5 VD = 3.3 or 5	Volume control, on-chip oscillator	28 TSSOP
WM8940	1 in, 1 out	98	-84	94	-80	48	Differential ADC Single-ended DAC	VA = 2.5 to 5.5 VD = 1.71 to 3.6	ALC volume control, filters, Headphone driver, PLL	24 QFN

Multichannel Codecs

Part Number	Channels	DAC Dynamic Range (dB)	DAC THD+N (dB)	ADC Dynamic Range (dB)	ADC THD+N (dB)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS4234	4 in, 5 out	108	-90	105	-95	192	Single-ended or Differential	VA = 3.3 or 5 VL = 1.8 to 5	PCM and TDM interfaces	40 QFN
CS42432	4 in, 6 out	108	-98	105	-98	192	Single-ended or Differential	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	TDM interface	52 MQFP
CS42435	4 in, 8 out	108	-98	105	-98	192	Single-ended or Differential	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	TDM interface	52 MQFP
CS42436/38	6 in, 6/8 out	105 / 108	-95 / -98	102 / 105	-95 / -98	192	Single-ended or Differential	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	TDM interface	52 MQFP
CS4244	4 in, 4 out	108	-90	105	-95	192	Single-ended or Differential	VA = 3.3 or 5 VL = 1.8 to 5	PCM and TDM interfaces	40 QFN
CS42448	6 in, 8 out	108	-98	105	-98	192	Single-ended or Differential	VA = 3.3 or 5 VD = 3.3 to 5 VL = 1.8 to 5	PCM and TDM interfaces	64 LQFP
CS42516/26	2 in, 6 out	110 / 114	-100	114	-100	192	Differential	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	S/PDIF Rx, digital volume control	64 LQFP
CS42518/28	2 in, 8 out	110 / 114	-100	114	-100	192	Differential	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	S/PDIF Rx, digital volume control	64 LQFP
CS42888	4 in, 8 out	108	-98	105	-98	192	Single-ended or Differential	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	PCM and TDM interfaces	64 LQFP
WM8994	6	100	-87	95	-82	8-96	Differential; Single-ended	VA = 1.8-3.3 VD = 1-3.3		72 WLCSP

AC '97 and HD Audio Codecs

Part Number	Bus Interface	DAC SNR/THD+N (dB)	ADC SNR/THD+N (dB)	Feature	Converters	Package
CS4207	HD-Audio	110 / -94	105 / -88	S/PDIF receiver with SRC, 2 S/PDIF transmitters, MIC pre-amp, HP amp, 2 DMIC inputs	Six 192 kHz DACs Four 96 kHz ADCs	48 QFN
WM9714	AC '97	94 / -85	87 / -86	S/PDIF transmitter	18-bit stereo DAC 18-bit stereo ADC	48 QFN

Stereo Low Power Codecs with Touchscreen Controller

Part Number	DACs / ADCs	Headphone driver	BTL speaker out	Control + data interface	Power Supply (V)	Features	Package
WM9712	3 / 3	Yes, 45 mW into 16 ohms	Yes, 400 mW	AC '97	VA = 1.8 to 3.6 VD = 1.5 to 3.6	AUX ADC, battery monitor	48 QFN
WM9713	4 / 3	Yes, 45 mW into 16 ohms	Yes, 400 mW	AC '97 PCM, I ² S	VA = 1.8 to 3.6 VD = 1.8 to 3.6	AUX ADC, battery monitor	48 QFN
WM9715	3 / 3	Yes, 45 mW into 16 ohms	Yes, 400 mW	AC '97	VA = 1.8 to 3.6 VD = 1.5 to 3.6	AUX, ADC, battery monitor	48 QFN

Low Power Codecs with Integrated Video Buffer

Part Number	DACs / ADCs	DAC SNR/THD+N (dB)	ADC SNR/THD+N (dB)	Headphone driver	Power Supply (V)	Features	Package
WM8944	1 / 1	96 / -80	94 / -83	Yes	VA = 2.4 to 3.6 VD = 1.7 to 3.6	AUX ADC, battery monitor	48 QFN
WM8946	2 / 2	98 / -80	94 / -83	Yes	VA = 2.4 to 3.6 VD = 1.7 to 3.6	AUX, ADC, battery monitor	48 QFN

Boosted Amplifiers, Audio Amplifiers

Part Number	Description	Vout(V) - Max	Output Power (W) @1% THD+N, into 8 ohm	DSP	Boost	Channels	Inputs	Supply (V)	Idle Power Consumption (mW)	Idle Noise (uV)	Size (mm2)	Package	Pitch (mm)
CS35L41	Boosted Class-D Smart Amp + DSP	11	5.3	Yes	Class-H	Mono	I ² S, TDM	2.5 - 5.5	6.7	9	6.43	30 WLCSP	0.4
WM9081	EQ, Dynamic range control, FLL		2.6 W into 4 ohm				Analog, I ² S	VP = 2.7 to 5.5 VA = 2.7 to 3.6 VD = 1.71 to 3.6				28 QFN	

Volume Control

Part Number	Channel	Dynamic Range (dB)	THD+N (dB)	Analog I/O	Power Supply (V)	Comments	Package
CS3310	2	116	-100	Single-ended	VA = ±5 VD = 5	+31.5 dB gain / -95.5 dB attenuation, 0.5 dB step	16 SOIC

Interfaces and Sample Rate Converters

Part Number	Sample Rate (kHz)	S/PDIF, IEC-60958 Transmitter	S/PDIF, IEC-60958 Receiver	AES/EBU	EIAJ CP1201	Host Interface	Sample Rate Converter	Power Supply (V)	Package
CS8406	192	1	—	✓	✓	✓	—	VD = 3.3 or 5 VL = 3.3 or 5	28 SOIC 28 TSSOP
CS8416	192	—	1	✓	✓	✓	—	VA = 3.3 VD = 3.3 VL = 3.3 to 5	28 SOIC 28 TSSOP 28 QFN
CS8421	192	—	—	—	—	—	✓	VD = 2.5 VL = 3.3 or 5	20 TSSOP 20 QFN
CS8422	192	—	1	✓	✓	✓	✓	VA = 3.3 VL = 1.8 to 5	32 QFN
WM8804	192	1	1	✓	—	✓	—	VD = 2.7 to 3.6	20 SSOP
WM8805	192	1	8	✓	—	✓	—	VD = 2.7 to 3.6	28 SSOP

Clock Generation and Jitter Reduction

Part Number	One-Time Programmable	Frequency Synth / Clock Generator	Clock Multiplier / Jitter Remover	Power Supply (V)	Input Frequency Range	Reference Frequency Range	Output Frequency Range	Package
CS2000	CS2000-OTP	✓	✓	3.3	50 Hz to 30 MHz	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2100	CS2100-OTP	—	✓	3.3	50 Hz to 30 MHz	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2200	CS2200-OTP	✓	—	3.3	—	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2300	CS2300-OTP	—	✓	3.3	50 Hz to 30 MHz	Internally generated	6 to 75 MHz	10 MSOP

Imaging A/D Converters

Part Number	Resolution (bits)	Speed (MSPS)	Input PGA	Offset (bits)	Output format	Control interface	Supply	Power (mW)	Description	Package
WM8196	16	12	8	8	CMOS: 8+8 4x4	Serial	4.8 to 5.2	300	3-channel CCD/CIS ADC	28 SSOP
WM8199	16	20	8	8	CMOS: 8+8 4x4	Serial	4.8 to 5.2	360	3-channel high speed CCD/CIS ADC	28 SSOP
WM8233	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit	Serial	3.3 V		6-channel high speed CCD/CIS ADC	56 QFN package 8 mm x 8 mm
WM8234	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit	Serial	3.3 V		6-channel high speed CCD/CIS ADC	56 QFN package 7 mm x 7 mm
WM8235	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5 pair CMOS 10-bit	Serial	3.3 V		9-channel high speed CCD/CIS ADC	56 QFN package 7 mm x 7 mm
WM8255	16	12	8	8	CMOS: 4x4, 2x8	Serial	3.3 to 3.75	250	Single channel CCD/CIS ADC	28 QFN

Haptics Drivers

Cirrus Logic is developing an advanced product portfolio of haptic and sensing integrated circuits (ICs) allowing OEMs to embed rich haptic feedback in sleeker, smaller form factor devices. These solutions are comprised of low-latency, high signal-to-noise ratio ICs with closed-loop algorithms that detect the presence of the user's touch, potentially triggering a variety of unique haptic feedback responses. Sophisticated haptic feedback allows sleeker, more robust devices with fewer mechanical controls to deliver responsive and immersive user experiences.

Haptics Drivers

Part Number	Description	Digital Power Supply (V)	Boosted Amplifier Digital Power Supply (V)	Output Power (W) @ 1% THD+N into 6 ohm	Operating Temperature Range (°C)	Max Boost Converter Voltage (V)	GPI Inputs	Control Port	Package
CS40L25	Haptic DSP + Boost Class D Amplifier	1.8	2.5–5.5	5.3	-40–+85	11	1 (with I ² S/TDM) 3 (w/o I ² S/TDM)	SPI or I ² C	30-ball WLCSP
CS40L25B	Haptic DSP + Boost Class D Amplifier	1.8	2.5–5.5	5.3	-40–+85	11	4	SPI or I ² C	30-ball WLCSP Or 32-pin QFN
CS40L25B-D	Haptic DSP + Boost Class D Amplifier, AEC-Q100 Qualified, Automotive Version	1.8	2.5–5.5	5.3	-40–+85	11	4	SPI or I ² C	32-pin QFN with Wettable Flanks
CS40L26	Haptic DSP + Boost Class D Amplifier	1.8	2.5–5.5	5.3	-40–+85	11	1 (with I ² S/TDM) 3 (w/o I ² S/TDM)	SPI or I ² C	30-ball WLCSP
CS40L26B	Haptic DSP + Boost Class D Amplifier	1.8	2.5–5.5	5.3	-40–+85	11	4	SPI or I ² C	30-ball WLCSP Or 32-pin QFN

Software Partners

Cirrus Logic has established a comprehensive ecosystem of software partners who provide technologies that significantly expand the use cases supported by Cirrus Logic smart codec range of products. By establishing partnerships with world-leading software companies, in combination with its high performance and low power built-in DSP technology, Cirrus Logic makes available to its customers a wide range of optimized audio functions across four domains: Voice, Playback, Record and Control. Cirrus Logic Software Partners' technologies offer customers a variety of different options to differentiate their products including:

- Audio Solution Architecture
- Mechanical and Acoustic Product Design
- Hardware and PCB Design
- Software Porting and Optimization
- Software Development and Integration
- Tuning Services
- Test, Validation and Certification

Voice Solutions Partner



Playback Solutions Partner



Record Solutions Partner



Control Solutions Partner



A Global Network of Professional Service Partners

Combining hardware and software into a single audio solution can pose a unique set of challenges. Each customer's design can have its own specific challenges ranging from form factor prototyping and acoustic tuning, to software stack integration. To assist customers in this development process, Cirrus Logic established a global network of trusted service partners who have been thoroughly vetted to provide customers with the right services to address these pivotal elements. This growing community of Professional Service Partners (PSPs) meets our exacting standards for quality and competence, and are fully equipped to support customers in perfecting the very best audio signal processing solution.



Quality

- Trained by Cirrus Logic
- Engineering support from Cirrus Logic and third party software partners



Scale

- Globally located
- Enables fast time-to-market
- Wide range of capabilities, no project too small!

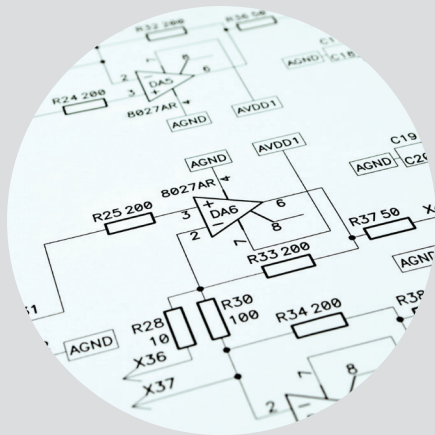


Competence

- Software and hardware integration
- Full-form factor design
- Audio tuning, testing

Partner Competencies

Cirrus Logic's growing community of Professional Service Partners are fully equipped and trained to address the challenges of building audio solutions tailored to each customer's exacting specifications. Our PSP network can provide a wide range of technical competencies to support the implementation of hardware and software solutions.



Technical Know-How

- System and architecture
- Audio and acoustic
- Embedded software
- Hardware and mechanical



Proven Audio Track Record

- Demonstrable expertise and experience in audio sub-system design
- Audio products delivered to the marketplace



Audio Laboratory and Services

- Audio measurements
- Audio test equipment
- Acoustic equipment, facilities, measurement and tuning

Our Global Support Network

How can we work together? Contact us today.



- ADSP
- Integration
- Tuning and testing
- Contact us: contact@taot.co



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- Tuning and testing
- Technical Staffing
- Contact us: service@novuslabs.com



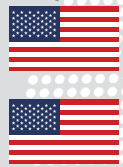
- ADSP
- Integration
- Tuning and testing
- Contact us: jez.stark@cambridgeconsultants.com



- ADSP
- Integration
- Tuning and testing
- Contact us: Christian.Axelsson@sigmaconnectivity.se



- ADSP
- Integration
- Tuning and testing
- Contact us: contact@taot.co



surfaceink

- ADSP
- Integration
- Tuning and testing
- Contact us: scott_mcneese@surfaceink.com

eSoftThings

- ADSP
- Integration
- Tuning and testing
- Contact us: c.lees@lacroix.group

sasken

- ADSP
- Tuning and testing
- Contact us: nishith.dhawan@sasken.com

SoCtronics

- ADSP
- Porting and integration
- Contact us: suman.kopparapu@soctrionics.com

For more information, visit support/partners/services on cirrus.com.

Communication Components

Cirrus Logic continues to maintain a design legacy for high-precision analog and mixed-signal processing ICs for industrial measurement applications — such as industrial process control, analytical instruments, and consumer utility. This design expertise is based on an advanced proprietary Delta-Sigma technology that is featured across a core group of product families including analog-to-digital converters, digital-to-analog converters, modulator and amplifier ICs, and ARM 9-based system-on-chip processors. As a pioneer in the development of world-class telecommunication ICs, Cirrus Logic also continues a lengthy tenure of providing customers with cost effective signal processing solutions.

Delta-Sigma A/D Converters

CS5510
CS5511
CS5512
CS5513
CS5529

Delta-Sigma A/D Converters with Integrated Amplifiers

CS5521
CS5522
CS5523
CS5524
CS5525*
CS5526*
CS5528
CS5530
CS5531
CS5532
CS5533
CS5534
CS5550

Energy Measurement

CS5451A
CS5463
CS5464
CS5467*
CS5480
CS5484
CS5490

*NRND

Delta-Sigma A/D Converters

Part Number	Resolution (bits)	Throughput (Sps)	Integral Linearity (%FS)	Differential Linearity ($\pm$ LSB)	Number of Channels	Power Consumption (mW)	Package
CS5510	16	53 – 212	0.0015%	NMC	1	1.4	8 SOIC
CS5511	16	100 (typical)	0.0015%	NMC	1	1.5	8 SOIC
CS5512	20	53 – 326	7.0E-4%	NMC	1	1.8	8 SOIC
CS5513	20	100 (typical)	7.0E-4%	NMC	1	1.9	8 SOIC
CS5529	16	1 – 303	0.0015%	NMC	1	2.6	20 SOIC

Delta-Sigma A/D Converters with Integrated Amplifiers

Part Number	Resolution (bits)	Throughput (Sps)	Integral Linearity (%FS)	Differential Linearity ($\pm$ LSB)	Number of Channels	Power Consumption (mW)	Package
CS5521	16	1 – 400	0.0015%	NMC	2	6	20 SSOP
CS5522	24	1 – 606	7.0E-4%	NMC	2	9	20 SSOP
CS5523	16	1 – 400	0.0015%	NMC	4	6	24 SSOP
CS5524	24	1 – 606	7.0E-4%	NMC	4	9	24 SSOP
CS5525*	16	3 – 606	0.0015%	NMC	1	9.4	20 SSOP
CS5526*	20	3 – 606	7.0E-4%	NMC	1	9.4	20 SSOP
CS5528	24	1 – 606	7.0E-4%	NMC	8	9	24 SSOP
CS5530	24	7 – 3840	$\pm$ 0.0015%	NMC	1	35	20 SSOP
CS5531	16	7 – 3840	$\pm$ 0.0015%	NMC	2	35	20 SSOP
CS5532	24	7 – 3840	$\pm$ 0.0015%	NMC	2	35	20 SSOP
CS5533	16	7 – 3840	$\pm$ 0.0015%	NMC	4	35	24 SSOP
CS5534	24	7 – 3840	$\pm$ 0.0015%	NMC	4	35	24 SSOP
CS5550	24	2440 – 4000	0.01%	NMC	2	21	24 SSOP

Energy Measurement

Part Number	ADC Converters	Current Sensor Options	Active Energy Accuracy, Dynamic Range	Reactive Energy Accuracy, Dynamic Range	IRMS Accuracy, Dynamic Range	SNR (dB)	Serial Comm	Digital Outputs	V _{REF} Drift (ppm/°C)	Input Voltage (V)	Power Cons. (mW)	Package
CS5451A	6	Shunt / CT	—	—	—	77	SPI	—	25	3 Analog; 3 Digital	23	28 SSOP
CS5463	2	Shunt / CT	0.1%, 1000:1	0.2%, 1000:1	0.2%, 1000:1	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	21	24 SSOP
CS5464	3	Shunt / CT	0.1%, 1000:1	0.2%, 1000:1	0.2%, 1000:1	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	25	28 SSOP
CS5467*	4	Shunt / CT	0.1%, 1000:1	0.2%, 1000:1	0.2%, 1000:1	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	25	28 SSOP
CS5480	3	Shunt / CT / Rogowski	0.1%, 4000:1	0.1%, 4000:1	0.15%, 1000:1	80	UART	3x Configurable Outputs	25	3.3	13	24 QFN
CS5484	4	Shunt / CT / Rogowski	0.1%, 4000:1	0.1%, 4000:1	0.1%, 1000:1	80	SPI / UART	4x Configurable Outputs	25	3.3	13	28 QFN
CS5490	2	Shunt / CT / Rogowski	0.1%, 4000:1	0.1%, 4000:1	0.1%, 1000:1	80	SPI / UART	Single Configurable Output	25	3.3	13	16 SOIC

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CORPORATE HEADQUARTERS
800 West Sixth Street
Austin, Texas 78701
United States

T +1 512-851-4000
Toll Free +1 800-888-5016

cirrus.com