

## Cirrus Logic

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### Clock Generation and Multiplication/Jitter Reduction Solution

Host Interface	Frequency Synth/ Clock Generator	Clock Multiplier/ Jitter Remover	Power Supply (V)	Input Frequency Range	Reference Frequency Range	Output Frequency Range	Package
CS2000	√	√	3.3	50 Hz to 30 MHz	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2100	—	√	3.3	50 Hz to 30 MHz	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2200	√	√	3.3	—	8 to 75 MHz	6 to 75 MHz	10 MSOP
CS2300	—	—	3.3	50 Hz to 30 MHz	Internally Generated	6 to 75 MHz	10 MSOP

### Audio A/D Converters

Part	Channels	Dynamic Range (dB)	THD+N (dB)	Sample Rate (kHz)	Analog Inputs	Power Supply (V)	Comments	Package
CS5340	2	101	-94	192	Sgl-end	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Pin compatible with CS5341	16 TSSOP
CS5341	2	105	-98	192	Sgl-end	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Pin compatible with CS5340	16 TSSOP
CS5342	2	105	-98	192	Sgl-end	VA = 3.3 or 5 VD = 3.3 or 5 VL = 2.5 to 5	384*Fs MCLK	16 TSSOP
CS5343	2	98	-92	96	Sgl-end	VA = 3.3 or 5	I2S	10 TSSOP
CS5344	2	98	-92	96	Sgl-end	VA = 3.3 or 5	LJ	10 TSSOP
CS5346	6	103	-95	192	Sgl-end	VA = 5 VD = 3.3 VL = 3.3 to 5	6:1 stereo input mux, Mic pre-amp, PGA, High input impedance	48 LQFP
CS5351	2	108	-98	192	Sgl-end	VA = 5 VD = 3.3 or 5 VL = 2.5 or 5	Functionally compatible with CS5361	24 SOIC
CS5361	2	114	-105	192	Differential	VA = 5 VD = 3.3 or 5 VL = 2.5 or 5	Pin compatible with CS5381	24 SOIC 24 TSSOP
CS5364/66/68	4,6,8	114	-105	192	Differential	VA = 5 VD = 3.3 to 5 VLS/VLC=1.8 to 5	4-/6-/8-Channel ADC, TDM, On-chip oscillator	48 LQFP
CS5381	2	120	-110	192	Differential	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Flagship performance	24 SOIC 24 TSSOP
CS53L21	2	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	32QFN

Part	Channels	Dynamic Range (dB)	THD+N (dB)	Sample Rate (kHz)	Analog Inputs	Power Supply (V)	Comments	Package
CS53L30	4	91	-84	8-48	Single-ended Differential	VP=3 to 5 VA=1.8	TDM interface, <2.5mW, mono analog MIC record, 4x MIC-bias	30 WLCSP 32QFN
WM8950	1	90	-80	8-48	Single-ended Differential	VP=2.7 to 3.6 VA=1.7 to 3.6	EQ, DSP filters, PGA, Master/Slave, PLL	24QFN
WM8952	1	94	-80	8-48	Single-ended Differential	VP=2.5 to 3.6 VA=1.71 to 3.6	HPF, DSP filters, PGA, Master/Slave, PLL	28WLCSP
WM8775	8	102	-90	32-96	Differential	VP=2.7 to 5.5 VA=2.7 to 3.6	ALC 2.0Vrms inputs, 2/3-wire SW control	28SSOP
WM8738	2	90	-87	96	Single-ended	VP=3 to 5.5 VA=3 to 3.6	Master/Slave, HW control	14SOIC
WM8781	2	102	-90	192	Single-ended	VP=2.7 to 5.5 VA=1.7 to 3.6	Master/Slave, HW control	20SSOP
WM8782	2	102	-90	192	Single-ended	VP=2.7 to 5.5 VA=1.7 to 3.6	Master/Slave, HW control	20SSOP
WM8786	2	111	-102	192	Differential	VP=4.5 to 5.5 VA=1.7 to 3.6	Master/Slave, HW control	20SSOP
WM8737	2	97	-86	16-96	Single-ended	VP=1.8 to 3.6 VA=1.7 to 3.6	ALC, PGA, Master/Slave	32QFN
WM8783	2	95	-83	8-96	Single-ended	VP=3 to 3.6 VA=3 to 3.6	PGA	8SOIC
WM8953	2	94	-82	8-48	Differential	VP=2.7 to 3.6 VA=1.71 to 3.6	Boost stages for each PGA, TDM interface, Master/Slave, PLL	42WLCSP

### D/A Converters

Part	Channels	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog Outputs	Power Supply (V)	Comments	Package
CS4334/35/38/39	2	96	-88	96	Sgl-end	VA = 5	Entry-level Stereo DAC	8 SOIC
CS4344/45/46/48	2	105	-90	192	Sgl-end	VA = 3.3 or 5	Upgrade for CS4340 and CS4340A	10 TSSOP
CS4349	2	101	-91	192	Sgl-end	VA = 3.3 or 5	Volume control, 1 VRMS @ 3.3V, Pin compatible with CS4350	24 TSSOP
CS4350	2	108	-95	192	Diff or Sgl-end	VA = 3.3 or 5	Integrated PLL, TDM	24 TSSOP
CS4351	2	112	-100	192	Sgl-end	VA = 9 or 12 VD=3.3 VL=1.8 to 3	Line Driver, 2 VRMS output	20 TSSOP
CS4352	2	106	-93	192	Sgl-end	VA = 9 or 12 VD = 3.3 VL = 1.5 to 3.3	Line Driver, 2 VRMS output	20 TSSOP
CS4353	2	106	-93	192	Sgl-end	VA = 3.3 VD = 3.3 VL = 0.9 to 3.3	Line Driver, 2 VRMS output	24 QFN
CS4354	2	101	-86	192	Sgl-end	VA/VD = 5.5 VL = 1.5 to 5	Line Driver, 2 VRMS output	14 SOIC

Part	Channels	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog Outputs	Power Supply (V)	Comments	Package
CS4361	6	105	-95	192	Sgl-end	VA = 5 VL = 1.8 to 5	Entry-level 6-Channel DAC	20 TSSOP
CS4362A/ 82A	6/8	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	6-/8-Channel DAC, DSD, footprint-compatible with CS4362/82	48 LQFP
CS4364/84	6/8	103	-88	192	Sgl-end	VA = 5 VD = 2.5 VL = 1.8 to 5	6-/8-Channel DAC, DSD, TDM, footprint-compatible with CS4365/85	48 LQFP
CS4365/85	6/8	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	6-/8-Channel DAC, DSD, TDM	48 LQFP
CS4385A	8	114	-100	192	Differential	VA = 5 VD = 2.5 VL = 1.8 to 5	8-Channel DAC, DSD, TDM(through HW mode, wide range TDM timings)	48 LQFP
CS4392	2	114	-100	192	Differential	VA = 5 VL = 1.8 to 5	DSD, selectable digital filters, pin compatible with CS4391A	20 TSSOP
CS4398	2	120	-107	192	Differential	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	Flagship DAC, DSD processor, selectable D-filter	28 TSSOP
CS43L21	2	98	-86	96	Single-end	VA=1.8 to 2.5 VD=1.8 to 2.5 VL=1.8 to 3.3	HP amp, volume control	32QFN
CS43L22	2	98	-86	96	Single-end	VA=1.65 to 2.83 VD=1.65 to 2.83 VP=2.37 to 5.35 VL=1.8 to 3.3	HP amp, Class-D speaker amp	40QFN
WM8761	2	100	-90	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 5.5	HW control	14SOIC
WM8766	6	103	-90	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 3.6	Digital volume control, HW and 3-wire SW control	28SSOP
WM8768	8	103	-90	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 3.6	Digital volume control, HW and 3-wire SW control	28SSOP
WM1824	2	106	-88	192	Single-end	VA=2.97 to 3.63 VD=1.62to 3.6	HW control	24QFN
WM8501	2	100	-88	192	Single-end	VA=4.5 to 5.5 VD=2.7 to 5.5	HW control	14SOIC
WM8501	2	98	-93	192	Single-end	VA=8.2 to 13.2 VD=2.7 to 3.6	HW control	14SOIC
WM8521	2	98	-81	192	Single-end	VA=8.2 to 13.2 VD=2.7 to 3.6	HW control	14SOIC
WM8523	2	106	-93	192	Single-end	VA=3 to 3.6 VD=3 to 3.6	Digital volume control, HW and 3-wire SW control	20TSSOP
WM8524	2	106	-93	192	Single-end	VA=3 to 3.6 VD=3 to 3.6	HW control	16TSSOP
WM8533	2	106	-89	192	Single-end	VA=2.97to 3.63(Typ3.3) VD=1.62 to 3.6 3(Typ1.8)	HW and 2/3-wire SW control	20WLCSP

Part	Chan nels	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog Outputs	Power Supply (V)	Comments	Package
WM8716	2	112	-97	192	Single-end	VA=3 to 5.5 VD=3 to 5.5	Selectable digital filter response, HW and 3-wire SW control	28SSOP
WM8718	2	111	-100	192	Differential	VA=3 to 5.5 VD=3 to 5.5	Digital volume control, 3-wire SW control	20SSOP
WM8725	2	99	-80	8-96	Single-end	VA=2.7 to 5.5 VD=2.7 to 5.5	HW control	14SOIC
WM8726	2	100	-88	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 5.5	HW control	14SOIC
WM8727	2	98	-84	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 5.5	HW control	8SOIC
WM8728	2	106	-97	192	Single-end	VA=3 to 5.5 VD=3 to 5.5	Digital volume control, HW and 2/3-wire SW control	20SSOP
WM8740	2	120	-104	192	Differential	VA=3 to 5.5 VD=3 to 5.5	Selectable digital filter response, HW and 3-wire SW control	28SSOP
WM8741	2	128	-100	192	Differential	VA=4.5 to 5.5 VD=3 to 3.6	Selectable advanced digital filter responses, HW and 2/3-wire SW control	28SSOP
WM8742	2	126	-100	192	Differential	VA=4.5 to 5.5 VD=3 to 3.6	Selectable advanced digital filter responses, HW and 2/3-wire SW control	28SSOP
WM8762	2	98	-84	192	Single-end	VA=2.7 to 5.5 VD=2.7 to 5.5	HW control	8SOIC
WM8711BL	2	90	-86	8-96	Single-end	VA=1.8 to 3.6 VD=1.42 to 3.6	Output volume and mute control, HP driver, Line-in to mixer, OSC	24QFN
WM8711L	2	90	-86	8-96	Single-end	VA=1.8 to 3.6 VD=1.42 to 3.6	Output volume and mute control, HP driver, Line-in to mixer, OSC	28SSOP 28QFN
WM8912	2	96	-86	8-96	Single-end	VA=1.7 to 2 VD=1 to 3.6	DRC, ReTune™ Mobile, control write sequencer, HP driver, PLL	32QFN
WM8918	2	96	-86	8-96	Single-end	VA=1.71 to 2.0 VD=1.42 to 3.6	5 band EQ, DRC, digital MIC interface, HP driver, PLL	32QFN
WM8955	2	98	-86	8-96	Single-end	VA=1.8 to 3.6 VD=1.42 to 3.6	Tone control and bass boost, HP driver, Line-in to mixer, PLL	28QFN 32QFN
WM8956	2	99	-84	8-96	Single-end	VA=2.7 to 5.5 VD=1.71 to 3.6	Direct battery connection, HP driver, Speaker driver, Line-in to mixer, PLL	32QFN

**Multi-Channel CODECs**

Part	Channels	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS42416/26	2 in, 6 out	110 / 114 DACs 114 ADCs	-100 DACs -100 ADCs	192	Diff DACs Sgl-end or Diff ADCs	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	Multi-Channel CODEC, 6 DACs, 2 ADCs, PLL, Digital volume control	64 LQFP
CS42418/28	2 in, 8 out	-100 DACs	-100 DACs	192	Diff DACs	VA = 5	Multi-Channel CODEC, 8 DACs, 2 ADCs, PLL, Digital volume control	64 LQFP
CS42432	4 in, 6 out	105 / 108 DACs 102 / 105 ADCs	-95 / -98 DACs -95 / -98 ADCs	192	Sgl-end or Diff DACs and ADCs	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	Multi-Channel CODEC, 6 DACs, 4 ADCs, TDM I/F	52 MQFP
CS42435	6 in, 8 out	105 / 108 DACs 102 / 105 ADCs	-95 / -98 DACs -95 / -98 ADCs	192	Sgl-end or Diff DACs and ADCs	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	Multi-Channel CODEC, 8 DACs, 4 ADCs, TDM I/F	52 MQFP
CS42436/38	6 in, 6/8 out	105 / 108 DACs 102 / 105 ADCs	-95 / -98 DACs -95 / -98 ADCs	192	Sgl-end or Diff DACs and ADCs	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	Multi-Channel CODEC, 6/8 DACs, 6 ADCs, TDM I/F	52 MQFP
CS4244	4 in, 4 out	108 DAC 105 ADC	-90 DAC -95 ADC	192	Sgl-end or Diff	VA = 3.3 or 5 VL = 1.8 to 5	4 DACs, 4 ADCs, PCM and TDM I/F	40 QFP
CS4234	4 in, 5 out	108 DAC 105 ADC	-90 DAC -95 ADC	192	Sgl-end or Diff	VA = 3.3 or 5 VL = 1.8 to 5	5 DACs, 4 ADCs, PCM and TDM I/F	40 QFP
CS42448	6 in, 8 out	105 / 108 DACs 102 / 105 ADCs	-95 / -98 DACs -95 / -98 ADCs	192	Sgl-end or Diff DACs and ADCs	VA = 3.3 or 5 VD = 3.3 VL = 1.8 to 5	Multi-Channel CODEC, 8 DACs, 6 ADCs, TDM and Normal I/F	64 LQFP
CS42516/26	2 in, 6 out	110 / 114 DACs 114 ADCs	-100 DACs -100 ADCs	192	Diff DACs Diff ADCs	VA = 5 VD = 3.3 or 5	Multi-Channel CODEC, 6 DACs, 2 ADCs, S/ PDIF Rx, Digital volume control	64 LQFP
CS42518/28	2 in, 8 out	110 / 114 DACs 114 ADCs	-100 DACs -100 ADCs	192	Diff DACs Diff ADCs	VA = 5 VD = 3.3 or 5 VL = 1.8 to 5	Multi-Channel CODEC, 8 DACs, 2 ADCs, S/ PDIF Rx, Digital volume control	64 LQFP
CS42888	4 in, 8 out	108 DACs 105 ADCs	-98 DACs -98 ADCs	192	Sgl-end or Diff DACs and ADCs	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Multi-Channel CODEC, 8 DACs, 4 ADCs, TDM and Normal I/F	64 LQFP
WM8580	2 in, 6 out	103 DACs 100 ADCs	-90 DACs -87 ADCs	192	Sgl-end	VA = 2.7 to 5.5 VD = 2.7 or 3.6	Two audio interfaces, HW and 2/3-wire SW control, PLLs	48TQFP
WM8581	2 in, 8 out	103 DACs 100 ADCs	-90 DACs -90 ADCs	192	Sgl-end	VA = 2.7 to 5.5 VD = 2.7 or 3.6	Two independent audio interfaces, HW and 2/3-wire SW control, PLLs	48TQFP
WM8594	10 in, 6 out	100 DACs 96 ADCs	-87 DACs -80 ADCs	192	Sgl-end	VA = 8.1 to 9.9 VD = 2.7 or 3.6	2Vrms line drivers, headphone driver, 2/3-wire SW control	48TQFP
WM8595	12 in, 4 out	100 DACs 96 ADCs	-87 DACs -80 ADCs	192	Sgl-end	VA = 8.1 to 9.9 VD = 2.7 or 3.63	2Vrms line drivers, digital multiplexer, 2/3-wire SW control	48TQFP
WM8770	16 in, 8 out	106 DACs 102 ADCs	-96 DACs -94 ADCs	192	Sgl-end	VA = 2.7 to 5.5 VD = 2.7 or 3.6	Analog and digital volume control, 3-wire SW control	64TQFP

**Mono/Stereo CODECs**

Part	Res (bits)	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS4245	6in,2out	104 ADC 104 DAC	c104 ADC 104 DAC	192	Sgl-end	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	2in,2out	104 ADC 104 DAC	-95 ADC -90 DAC	192	Sgl-end	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 out	32 QFN
CS4270	2in,2out	105 ADC 105 DAC	-95 ADC -95 DAC	192	Sgl-end	VA = 3.3 or 5 VD = 3.3 or 5 VL = 1.8 to 5	Volume Control, Passive Filters, 3.3V op	24 TSSOP
CS4271	2in,2out	108 ADC 114 DAC	-98 ADC -100 DAC	192	Sgl-end ADC Diff DAC	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Stereo CODEC, volume control, compatible with CS4272	28 TSSOP
CS4272	2in,2out	114 ADC 114 DAC	-100 ADC -100 DAC	192	Diff ADC Diff DAC	VA = 5 VD = 3.3 or 5 VL = 2.5 to 5	Stereo CODEC, vol control, on- chip oscillator	28 TSSOP
WM8569	2in,2out	103DAC 100ADC	-95DAC -80ADC	192	Sgl-end	VA=2.7 to 5.5 VD=2.7 to 3.6	ALC volume control,3-wire SW control	28SSOP
WM8776	10in,2out	108DAC 102ADC	-97DAC -95ADC	192	Differential	VA=2.7 to 5.5 VD=2.7 to 3.6	HP amplifier ALC,2/3-wire SW control	48TQFP
WM8778	2in,2out	108DAC 102ADC	-97DAC -95ADC	192	Differential	VA=2.7 to 5.5 VD=2.7 to 3.6	ALC volume control,2/3-wire SW control	28SSOP
WM8510	1in,1out	93DAC 90ADC	-84DAC -80ADC	48	Diff ADC Sgl-end DAC	VA=2.5to 5.5 VD=1.7 1to 3.6	ALC volume control, DSP filters, 2/3-wire SW control	28SSOP
WM8940	1in,1out	98DAC 94ADC	-84DAC -80ADC	48	Diff ADC Sgl-end DAC	VA=2.5 to 5.5 VD=1.71 1to 3.6	ALC volume control, filters Headphone driver, PLL	24QFN
WM8974	1in,1out	98DAC 94ADC	-84DAC -83ADC	48	Diff ADC Sgl-end DAC	VA=2.5 to 5.5 VD=1.71 1to 3.6	ALC volume control, DSP filters, EQ, PLL	24QFN

**Portable Audio Converters**

Part	DACs/ ADCs	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS42L51	2/2	98 ADC 98 DAC	-88 ADC -86 DAC	96	Sgl-end	VA = 1.8 to 2.5 VD = 1.8 to 2.5 VL = 1.8 to 3.3	CODEC, 3:1 MUX, PGA, MIC-PRE, HP Amp	32 QFN
CS42L52	2/2	99 ADC 98 DAC	-88	96	Sgl-end	VAVD = 1.65 to 2.83 VP = 2.37 to 5.35 VL = 1.8 to 3.3	CODEC w/ PWM Speaker Driver	40 QFN
CS42L55	2/2	95 ADC 99 DAC	-87 ADC -86 DAC	48	Pseudo Diff	VAVD = 1.65 to 2.71 VCP = 1.65 to 2.71 VL = 1.65 to 3.47	CODEC, Class-H HP amp, 2:1 mux, PGA	36 QFN



Part	DACs/ ADCs	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
CS42L56	2/2	95 ADC 99 DAC	-87 ADC -86 DAC	48	Pseudo Diff	VA/VD = 1.62 to 2.75 VCP = 1.62 to 2.751 VL = 1.62 to 3.63	CODEC 2:1 MUX,PGA, Class-H HP amp	40QFN
CS42L73	4/2	91ADC 97 DAC	-85	48	Pseudo Diff	VA/VCP/VL = 1.66 to 1.94 VP = 3.0 to 5.25 VD = 0.85 to 1.40	2ADC,4DAC Class-H HP Class AB SPK 3 asynchronous serial port	60 WLCSP
WM1811	2/2	100DAC 94ADC	-83DAC -84ADC	96	Sgl-end Diff	VA=1.71 to 5.5 VD=1.0 to 3.6	ReTune™ parametric EQ, dynamic range controller ,digital noise gate,ASRC,2Xdmic interface, HP/Speaker amps, dual FLL	80WLCSP
WM8946	2/2	98DAC 94ADC	-83		Sgl-end Diff	VA=2.4 to 3.6 VD=1.71 to 3.6	ReTune™, EQ,DSP filters,3D,Video buffer, HP/Speaker amps, FLL	36WLCSP
WM8948	2/2	98DAC 94ADC	-83	48	Sgl-end Diff	VA=2.4 to 3.6 VD=1.71 to 3.6	ReTune™, EQ,DSP filters,3D,Video buffer, HP/Speaker amps ,FLL	36WLCSP
WM8980	2/2	98DAC 90ADC	-84DAC -80ADC	48	Diff	VA=2.5 to 3.6 VD=1.71 to 3.6	EQ,3D, DSP filters, Video buffer, HP/ Speaker amps, FLL	40QFN
WM8731	2/2	100DAC 90ADC	-86DAC -84ADC	96	Sgl-end	VA=1.8 to 3.6 VD=1.42to 3.6	High pass filters, MIC input, HP amp, OSC	28QFN
WM8734	2/2	100DAC 90ADC	-86DAC -84ADC	96	Sgl-end	VA=2.7 to 3.6 VD=2.7to 3.6	High pass filters	20SSOP
WM8750	2/2	98DAC 95ADC	-84DAC -82ADC	96	Sgl-end Diff	VA=1.8 to 3.6 VD=1.42 to 3.6	EQ,3D,MIC interface ALC,HP/Speaker amps	32QFN
WM8753	3/2	98DAC 95ADC	-84DAC -82ADC	96	Sgl-end Diff	VA=1.8 to 3.6 VD=1.4 to 3.6	Differential MIC inputs, HP/Speaker amps, PLL	48QFN 55BGA
WM8758	2/2	100DAC 92.5ADC	-86DAC -75ADC	48	Differential	VA=2.5 to 3.6 VD=1.71 to 3.6	3D,EQ,DSP filters, HP amp, PLL	32QFN
WM8903	2/2	96DAC 93ADC	-86DAC -80ADC	48	Sgl-end Pseudo- Differential	VA=1.71 to 2 VD=1.14 to 1.89	Dynamic range control, digital sidetone, Digital microphone interface, HP amp	40QFN
WM8904	2/2	96DAC 92ADC	-86DAC -80ADC	96	Sgl-end Diff	VA=1.71 to 2 VD=0.95 to 3.6	ReTune™ Mobile parametric EQ, dynamic range controller, DMIC interface,HP amp,FLL	32QFN 36WLCSP
WM8958	4/2	100DAC 94ADC	-83DAC -84ADC	96	Sgl-end Diff	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	72WLCSP
WM8960	2/2	98DAC 95ADC	-84DAC -82ADC	48	Sgl-end	VA=2.5 to 3.6 VD=1.71 to 3.6	3D,MIC interface ALC,HP/Speaker amps, PLL	32QFN

Part	DACs/ ADCs	Dynamic Range (Db)	THD+N (Db)	Sample Rate (kHz)	Analog I/O	Power Supply (V)	Comments	Package
WM8962	2/2	98DAC 94ADC	-79DAC -86ADC	96	Sgl-end	VA=1.7 to 2.0 VD=1.62 to 2.0	VSS,HD Bass,ReTune ™,3D,EQ,DRC,DMIC interface, programmable ALC& noise gate, HP/Speaker amps, PLL,FLL	49WLCSP
WM8962B	2/2	98DAC 94ADC	-79DAC -86ADC	96	Sgl-end	VA=1.7 to 2.0 VD=1.62 to 2.0	VSS,HD Bass,ReTune ™,3D,EQ,DRC,DMIC interface, programmable ALC& noise gate, HP/Speaker amps, PLL,FLL	49WLCSP
WM8976	2/1	98DAC 95ADC	-84DAC -84ADC	48	Diff	VA=2.5 to 5.5 VD=1.7 to 3.6	EQ,3D,DSP filters, MIC interface ALC,HP/Speaker amps, PLL	32QFN
WM8978	2/2	98DAC 95ADC	-84DAC -84ADC	48	Diff	VA=2.5 to 5.5 VD=1.7 to 3.6	EQ,3D,DSP filters, MIC interface ALC,HP/Speaker amps, PLL	32QFN
WM8983	2/2	98DAC 95ADC	-84DAC -84ADC	48	Diff	VA=2.5 to 5.5 VD=1.7 to 3.6	EQ,3D,DSP filters, MIC interface ALC,HP/Speaker amps, PLL	32QFN
WM8985	2/2	98DAC 92.5ADC	-86DAC -75ADC	48	Diff	VA=2.5 to 3.6 VD=1.71 to 3.6	EQ,3D,DSP filters, MIC interface ALC,HP amp, PLL	32QFN
WM8988	2/2	100DAC 93ADC	-90DAC -81ADC	96	Diff	VA=1.8 to 3.6 VD=1.42 to 3.6	EQ,3D,bass boost, MIC interface ALC,HP amp,	28COL
WM8993	2/2	100DAC 94ADC	-86DAC -87ADC	48	Sgl-end Diff	VA=2.2 to 3.6 VD=1.1 to 2.0	ReTune™, parametric EQ, dynamic range controller, Active noise reduction, HP/ Speaker amps, FLL	48WLCSP
WM8994	4/2	100DAC 94ADC	-83DAC -84ADC	96	Sgl-end Diff	VA=1.71 to 5.5 VD=1.0 to 3.6	ReTune™ Mobile, parametric EQ, dynamic range controller, ASRC, HP/Speaker amps, dual FLL	72WLCSP
WM8996	4/2	99DAC 94ADC	-81DAC -81ADC	48	Diff	VA=1.71 to 3.6 VD=0.95 to 2.0	ReTune™, parametric EQ, dynamic range controller, ISRC, 4x DMIC interface, 2x PDM Speaker amp interface, HP amp, FLL	54WLCSP



**HD Audio CODECs**

Part	Bus interface	DAC SNR/THD+N(dB)	ADC SNR/THD+N(dB)	Feature	Converters	Power Supply (V)	Comments	Package
CS4207	HD-Audio	110/-94	105/-88	S/PDIF receiver with SRC, 2S/PDIF transmitters, MIC pre-amp, HP amp, 2DMIC inputs	Six 192KHZ DACs Four 96 ADCs	VD = 1.5 to 1.8 VA = 3.3 to 5 V_HP = 3.3 to 5 V_HD = 1.5 to 3.3 VL = 3.3	6 DACs, 4 ADCs, Ground-centered HP Amp, Mic Pre, PGA, SPDIF TX/RX, Jack Detect	48 QFN
WM8850	HD-Audio	108/-96	105/-95	S/PDIF transceiver	Six 192KHZ DACs Four 96 ADCs	4.5 to 5.5	S/PDIF transceiver	48 QFN
WM8860	HD-Audio	108/-96	105/-95	S/PDIF transmitter	Four 192KHZ DACs Four 96 ADCs	4.5 to 5.5	S/PDIF transceiver	48 QFN

**Voice Processors**

Part	Processor	Voice band	Speed Algorithms	Playback Algorithms	Speed (MIPS)	Operating Range	I/O Voltage	Package
CS48LV12	32-bit Dual MAC	Narrow,HD Voice/Wide	none	Cirrus Logic (included)	130	0 to 70/-40 to 105	1.8-3.3V	20WLCSP 24QFN
CS48LV13	32-bit Dual MAC	Narrow,HD Voice/Wide	ASR Enhanced (included), VAD (included), TrulyHandsfree (optional)	Cirrus Logic (included), Dolby (optional), DTS (optional)	130	0 to 70/-40 to 155	1.8-3.3V	20WLCSP 24QFN

**Audio Amplifiers**

Part	Input	Channels)	Output Power (W)	SNR(dB)	THD+N @ 1W	Power Supply (V)	Comments	Package
CS35L00	Analog	1x Mono Hybrid Class-D Speaker Driver	2.8W into 4ohm	98	0.02	2.5 to 5.5	Selectable+6/+12dB gain, < 1mAquiescent current	10DFN
CS35L01	Analog	1x Mono Hybrid Class-D Speaker Driver	3W into 4ohm	98	0.02	2.5 to 5.5	+6dB gain, < 1mAquiescent current	9WLCSP
CS35L03	Analog	1x Mono Hybrid Class-D Speaker Driver	3W into 4ohm	98	0.02	2.5 to 5.5	+12Db gain, < 1mAquiescent current	9WLCSP
CS35L32	Analog	1x Boosted Mono Class-D Speaker Driver	1.7W into 8ohm	102	0.02	VP=3.0 to 5.24 VA=1.71 to 1.89	5V boost controller, Speaker current and voltage monitoring, I2S and I2C interfaces	30WLCSP
CS44418	Analog	4	5W into 4 ohm per channel	/	0.13	VP=2.5 to 18.5 VA=5.0 VL=3.1 to 5.25	Class-H amplifier, speaker diagnostics via I2C < 50uV at 18 dB gain	44HSOP

Part	Input	Channels)	Output Power (W)	SNR(dB)	THD+N @ 1W	Power Supply (V)	Comments	Package
WM9010	Analog	1x Stereo Class-G Headphone Driver	34mW into 16 ohm	104	/	1.71 to 2.0	/	12WLCSP
WM9081	Analog,I2S	1x Mono Class-AB/D Speaker Driver, 1x Line out	2.6W into 4ohm	92	0.03	VP=2.7 to 5.5 VA=2.7 to 3.6 VD=1.71 to 3.6	EQ, Dynamic range control, FLL	28COL
WM9082	PDM,	1x Mono Class-D Speaker Driver	3W into 4ohm	92	0.03	VP=3.2 to 5.5 VD=1.35 to 2.0	48KHz sample rate	9WLCSP
WM9094	Analog	1x Mono Class-D Speaker Driver 1x Stereo Class-AB Headphone Driver	2W into 4ohm Speaker 34mW into 16 ohm Headphone	92	0.02	VP=2.7 to 5.5 VD=1.71 to 2.0	Single-ended or differential stereo inputs, AGC, Mixer, Voice bypass	20WLCSP

**MEMS Microphones: Analog Silicon Microphone**

Part	Description	SNR(dB)	AOP at 10% THD(dB SPL)	Sensitivity (dBV/Pa)	Sensitivity tolerance(dB)	Supply (V)	Supply Current(VA)	Package
WM7121D	Top Port Analog Silicon Microphone	62	130	-42	±3	1.5 to 3.7	190	3.76x2.95 x1.10mm
WM7121E	Top Port Analog Silicon Microphone	65	127	-38	±1	1.5 to 3.7	190	3.76x2.95 x1.10mm
WM7121PE	Top Port Analog Silicon Microphone	65	127	-38	±1	1.5 to 3.7	190	3.76x2.95 x1.10mm
WM7132D	Bottom port Analog Silicon Microphone	62	120	-42	±3	1.5 to 3.7	190	3.76x3.00 x1.10mm
WM7331	Bottom port Analog Silicon Microphone	63	124	-38	±3	1.5 to 3.7	190	2.5x1.6 x0.9mm
WM7331E	Bottom port Analog Silicon Microphone	63	124	-38	±1	1.5 to 3.7	190	2.5x1.6 x0.9mm

**MEMS Microphones: Digital Silicon Microphone**

Part	Description	SNR(dB)	AOP at 10% THD(dB SPL)	Sensitivity (dBV/Pa)	Sensitivity tolerance(dB)	Supply (V)	Supply Current(VA)	Package
WM7211E	Top Port Digital Silicon Microphone	61	120	-26	±1	1.64 to 3.7	735	4.0x3.0 x1.0mm
WM7236E	Bottom port Analog Silicon Microphone	60(Voice Mode) 63(Record Mode)	120	-26	±1	1.62 to 3.7	300(Voice Mode) 950(Record Mode)	4.0x3.0 x1.0mm
WM7216E	Top Port Digital Silicon Microphone	60(Voice Mode) 63(Record Mode)	120	-26	±1	1.62 to 3.7	300(Voice Mode) 950(Record Mode)	4.0x3.0 x1.0mm

**Analog Volume Control**

Part	Ch	Dynamic Range (dB)	THD+N (dB)	Analog I/O	Power Supply (V)	Comments	Package
CS3308	8	123	-110	Sgl-end	VA = ±5 VD = 3.3	+22 dB gain / -96 dB attenuation, 0.25 dB step	48 LQFP
CS3310	2	116	-100	Sgl-end	VA = ±5 VD = 5	+31.5 dB gain / -95.5 dB attenuation, 0.5 dB step	16 SOIC
CS3318	8	127	-110	Sgl-end	VA = ±8 or ±9 VD = 3.3	+22 dB gain / -96 dB attenuation, 0.25 dB step	48 LQFP

**Interfaces & Sample Rate Converters**

Part	Sample Rate (kHz)	S/PDIF Tx	S/PDIF Rx	AES/EBU	EIAJ CP1201	Host Interface	Channel Status Buffer Memory	SRC	Package
CS8406	192	√	—	√	√	√	√	—	28 SOIC 28 TSSOP
CS8416	192	—	√	√	√	√	√	—	28 SOIC 28 TSSOP 28 QFN
CS8420	96	√	√	√	√	√	√	√	28 SOIC
CS8421	192	—	—	—	—	—	—	√	20 TSSOP 20 QFN
CS8422	32 211	—	√	√	√	√	√	√	32 QFN
CS8427	96	√	√	√	√	√	√	—	28 SOIC 28 TSSOP
WM8804	192	√	√	√	—	√	√	—	20SSOP
WM8805	192	√	8	√	—	√	√	—	2SSOP

**Ambient Noise Cancellation**

Part	Output channels	Output Power	SNR/THD+N	Power Supply(V)	Ambient reduction (dB)	Noise cancellation bandwidth(Hz)	Input	Comments	Package
WM2000	1x Mono differential	80mW, 16ohm BTL	94/-70 (ANC off) 87/-67 (ANC on)	Speaker: 2.7 to 3.6 Digital: 1.71 to 1.89	Up to 20	300 to 2500	Single-ended/ Differential	Handset receiver speaks driver with ambient noise cancellation	25WLCSP
WM2002	Stereo single-ended or differential	45mW per channel into a 16ohm load 22mW per channel into 32ohm load	92/-80 (ANC off) 83/-81 (ANC on)	1.5V AAA battery using internal boost: 0.9 to 1.6 2.5V direct supply: 2.0 to 3.3	Up to 30	40 to 4000	Single-ended/ Differential	Low power, Stereo headphone driver with ambient noise cancellation	48QFN
WM2200	2x differential 1x PD, M	60mW 16ohm BTL	100/-71 (ANC off) 100/-71 (ANC on)	Analog: 1.71 to 1.89 Digital: 0.95 to 3.6	Receive path: up to 30	300 to 3500	Analog MIC Single-ended/ Differential Digital MIC, Line input	Low power, Stereo headphone driver with ambient noise cancellation	110WLCSP

**Audio DSPs**

Part	Processor	Key Firmwares & Features	Temp Range	Package
CS485xxx	Tiny, cost effective, mega performance PCM processors targeted for: mini-systems, DVD receivers, speaker bars, car audio, DTVs			
CS48520	Single 32-bit	4 channel audio PP1	150 MHz (300 M MAC/Sec) / C grade	48 QFP
CS48540	Single 32-bit	8 channel audio PP1	150 MHz (300 M MAC/Sec) / C,D grade	48 QFP
CS48560	Single 32-bit	12 channel audio PP1	150 MHz (300 M MAC/Sec) / C,D grade	48 QFP
CS4953xx	Single chip multistandard surround sound decoder targeted for playpack from analog & S/PDIF sources			
CS495314	Dual 32-bit	(DD, DDEX, DTS, DTSES, DTS96, AAC) + PP2	150 MHz (600 M MAC/Sec) / C,D grade	128 LQFP
CS497xxx	Single chip multistandard surround sound decoder targeted for playpack from HD DVD™, Blu-ray Disc® players, & all analog, S/PDIF & HDMI® sources			
CS497014	Dual 32-bit	(DD+, DTHD, DD, DDEX, AAC) + PP2	150 MHz (600 M MAC/Sec) / C,D grade	144 LQFP
CS49834	Tri 32-bit	DD+,DTHD,DTSHRA,DTSM,DTSLBR,DTSES, DTS96, DD, DDEX, DTS, AAC + PP2	1.8 Giga 32 x 32 MACs @ 300 MHz.	144 LQFP
CS48Lxx	Ultra low power voice and Audio DSP subsystem			
CS48L10	Single 32-bit	MP3, WMA,AAC	1.0V 80MHz or 1.2V 130M / C,D,E grade	24 QFP 24WLSCP
CS48L11	Single 32-bit	MP3, WMA,AAC,AC3,DH,PL2	1.0V 80MHz or 1.2V 150M / C,D,E grade	24 QFP

C grade parts have a temperature range between 0°C and 70°C, D grade parts have a temperature range between -40°C and 85°C, and E grade parts have a temperature range between -40°C and 105°C.

**WM00XX Ultra low power voice and Audio DSP subsystem targeted for:mini-system, DVD receivers, soundbars, car audio, DTVs**

Part	Processor	Key Firmwares & Features	DSP Core Speed	Package
WM0010	Tensilica HiFi 2	Embedded system software with RTOS	208MHz	42WLSCP
WM0011	Tensilica HiFi EP	Embedded system software with RTOS	260MHz	49WLSCP

**Audio SOC**

Part	DAC/ADC Dynamic Range(dB)	DAC /ADC THD+N(dB)	Sample Rate(KHz)	Analog I/O	Power Supply(V)	Comments	Package
CS47024	108/105	-98/-98	96	Diff	VA=3.3 VA=1.8	2 ADC w/ 5:1 mux, 4 DAC SPDIF Rx/Tx,2CH HW SRC, SW SRC	100 LQFP
CS47028	108/105	-98/-98	96	Diff	VA=3.3 VA=1.8	2 ADC w/ 5:1 mux on 1 ADC, 8 DAC SPDIF Rx/Tx,8CH HW SRC	100 LQFP
CS47048	108/105	-98/-98	96	Diff	VA=3.3 VA=1.8	4 ADC w/ 5:1 mux on 1 ADC 8 DAC SPDIF Rx/Tx,8CH HW SRC	100 LQFP
WM5102	112/96	-89/-88	192	Sgl-end Diff	VA=1.7 to 5.5 VD=1.14 to 1.9	7DAC/6ADC,Tx noise reduction, AEC, Rx speech clarity, Dynamic range control, parametric EQ, DSP filters, ASRC, haptic control signal generator, SLIMbus interface, 3x digital audio interface, HP/Speaker amps , dual FLL	137WLSCP

Part	DAC/ADC Dynamic Range(dB)	DAC /ADC THD+N(dB)	Sample Rate(KHz)	Analog I/O	Power Supply(V)	Comments	Package
WM5102S	120/96	-89/-88	192	Sgl-end Diff	VA=1.7 to 5.5 VD=1.14 to 1.9	7DAC/6ADC, Master Hi-Fi, Dynamic range control, parametric EQ, DSP filters, ASRC, haptic control signal generator, SLIMbus interface, 3x digital audio interface, HP/Speaker amps, dual FLL	137WLCSP
WM8281	121/10	-92/-89	192	Sgl-end Diff	VA=1.7 to 5.5 VD=1.14 to 1.9	8DAC/6ADC, up to 6 analogue or 8 digital mic input, 3stereo output path, Pop suppression function, stereo 2*2W Class-D speaker output drivers, 4 ch digital speaker interface(PDM)	138WLCSP
WM8998	122/96	-89/-88	192	Sgl-end Diff	VA=1.7 to 5.5 VD=1.14 to 3.74	7DAC/3ADC, Wind noise reduction, Dynamic range control, Parametric EQ, DSP filters, ASRC, SLIMbus interface, 3x digital audio interface, dual FLL	117WLCSP

#### Stereo Low Power Codecs with Touchscreen Controller

Part	DACs ADCs	Headphone driver	BTL speaker out	Control +data interface	Power Supply(V)	Features	Package
WM9705	2/2	Yes	No	AC'97	VA = 3.0 to 5.0 VD = 3.0 to 5.0	AUX ADC, battery monitor	48 QFN 48TQFP
WM9712	3/3	Yes,45mW into 16ohms	Yes,400mW	AC'97	VA = 1.8 to 3.6 VD = 1.5 to 3.6	AUX ADC, battery monitor	48 QFN
WM9713	4/3	Yes,45mW into 16ohms	Yes,400mW	AC'97 PCM, I2S	VA = 1.8 to 3.6	AUX ADC, battery monitor	48 QFN
WM9715	3/3	Yes,45mW into 16ohms	Yes,400mW	AC'97	VA = 1.8 to 3.6 VD = 1.5 to 3.6	AUX ADC, battery monitor	48 QFN

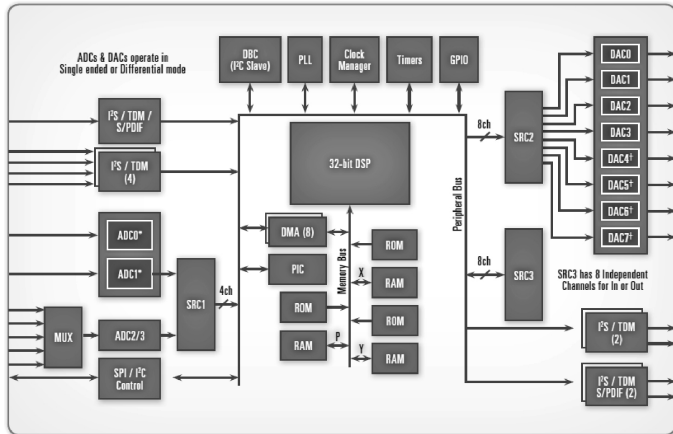
#### Low Power Codecs with Integrated Video Buffer

Part	DACs ADCs	DAC/ADC SNR(dB)	DAC/ADC THD + N(dB)	Headphone driver	Power Supply(V)	Features	Package
WM8941	1/1	98/91	-80/-83	Yes,45mW into 16ohms	VA = 2.5 to 3.6 VD = 1.7 to 3.6	AUX ADC, battery monitor	48 QFN 48TQFP
WM8944	1/1	96/94	-80/-83	Yes	VA = 2.4 to 3.6 VD = 1.7 to 3.6	AUX ADC, battery monitor	48 QFN
WM8945	1/1	98/94	-80/-83	Yes	VA = 2.4 to 3.6 VD = 1.7 to 3.6	AUX ADC, battery monitor	48 QFN
WM8946	2/2	98/94	-80/-83	Yes	VA = 2.4 to 3.6 VD=1.7 to 3.6	AUX ADC, battery monitor	48 QFN
WM8948	2/2	98/94	-80/-83	Yes	VA=2.4 to 3.6 VD = 1.7 to 3.6	ReTune™, EQ, DSP filters, 3D	36WLCSP
WM8980	2/2	98/95	-84/-80	Yes,45mW into 16ohms	VA = 2.5 to 5.5 VD = 1.7 to 3.6	EQ, DSP filters, HPF	40QFN

### ● CS47048 Audio SOC

The CS470xx Family audio SoC gives OEMs a cost-effective and simple-to-design audio processing solution with integrated high-performance mixed signal that provides an extensive selection of enhanced audio features to maximize the end user's listening experience within the automotive entertainment space.

### CS47048 Block Diagram



### Features

- Cost-effective, High-performance 32-bit DSP
- Integrated DAC & ADC Functionality
- Configurable Serial Audio Inputs/Outputs
- Supports Different Fs Sample Rates
- DSP Tool Set w/ Private Keys Protect Customer IP
- Integrated Clock Manager/PLL
- Input Fs Auto Detection w/  $\mu$ C Acknowledgement
- Host & Boot via SPI / I<sup>2</sup>C Serial Interface
- Configurable GPIOs and External Interrupt Input
- 1.8V Core and a 3.3V I/O that is tolerant to 5V input
- Low-power Mode: 620 $\mu$ W

### Imaging A/D Converters

Part	Resolut ion(bits)	Speed (MSPS)	Input PGA	Offset (bits)	Output format	Control interface	Supply	Power (mW)	Description	Package
WM8152	16	12	8	8	CMOS:4X4	Serial	4.8 to 5.2	225	Single channel CCD/CIS ADC	20 SSOP
WM8196	16	12	8	8	CMOS:8+8 4X4	Serial	4.8 to 5.2	300	3channel CCD/CIS ADC	28 SSOP
WM8199	16	20	8	8	CMOS:8+8 4X4	Serial	4.8 to 5.2	360	3channel high speed CCD/ CIS ADC	28 SSOP
WM8213	16	24	9	8	CMOS:8+8 4X4	Serial	3.0 to 3.6	350	3channel CCD/CIS ADC	28 SSOP
WM8214	16	40	9	8	CMOS:8+8 4X4	Serial	3.0 to 3.6	390	3channel high speed CCD/ CIS ADC	28 SSOP
WM8215	16	60	9	8	CMOS:10-bit	Serial	3.0 to 3.6	360	3channel high speed CCD/ CIS ADC	28 SSOP

**Imaging A/D Converters**

Part	Resolution(bits)	Speed (MSPS)	Input PGA	Offset (bits)	Output format	Control interface	Supply	Power (mW)	Description	Package
WM8224	10/16	40/60	9	8	CMOS 10(10-bit) 8+8(16-bit)	Serial	3.0 to 3.6	360	3channel high speed CCD/CIS ADC- Multiple Device Operation and automatic black level calibration	32 QFN
WM8232	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5pair CMOS 10-bit	Serial	3.3		3channel high speed CCD/CIS ADC	56 QFN package 8x8mm
WM8233	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5pair CMOS 10-bit	Serial	3.3		6channel high speed CCD/CIS ADC	56 QFN package 8x8mm
WM8234	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5pair CMOS 10-bit	Serial	3.3		6channel high speed CCD/CIS ADC	56 QFN package 7x7mm
WM8235	16	70	12-bit	8	LVDS 10-bit 5 pair LVDS 16-bit 5pair CMOS 10-bit	Serial	3.3		9channel high speed CCD/CIS ADC	56 QFN package 7x7mm
WM8253	16	6	8	8	CMOS:4x4	Serial	3.0 to 3.6	132	Single channel CCD/CIS ADC	20 SSOP
WM8255	16	12	8	8	CMOS:2x8 4X4	Serial	3.3 to3.75	250	Single channel CCD/CIS ADC	28 QFN
WM8259	16	3	8	8	CMOS:4X4	Serial	2.97 to 3.63	132	Single channel CCD/CIS ADC	20 SSOP

**CobraNet System Modules**

Product	Description	CobraNet® Part Numbers	Audio Channels over Ethernet	Serial Input/ Output Ports	Integrated DSP (MIPS)	Board Dimensions
CM-1	Digital audio network interface module with dual Ethernet ports	See your Cirrus Logic sales representative for available models.	32	Quad synchronous, up to 32 channels at 48 and/or up to 96 kHz sample rates		3.5" X 3.5"
CM-2	Digital audio network interface module with dual Ethernet ports and audio DSP (available as a reference design)	CPB181012-CM2, CPB181022-CM2, CS496122-CM2, (all available with female-bottom or male-top headers)	16	Quad synchronous, capable of supplying up to 16 full-duplex channels at 48 kHz sample rate or up to 8 full-duplex channels at 96 kHz sample rate	32-bit DSP, 120 MIPS	3.5" X 3.5"
EV-2	CobraNet development platform for use with the CM-1 and CM-2 modules	CDB-496122-EV2	16	One digital AES3 input stream (two channels) or one digital AES3 output stream (two channels). Two analog audio input channels, two analog audio output channels	32-bit DSP, 120 MIPS	8" X 7"



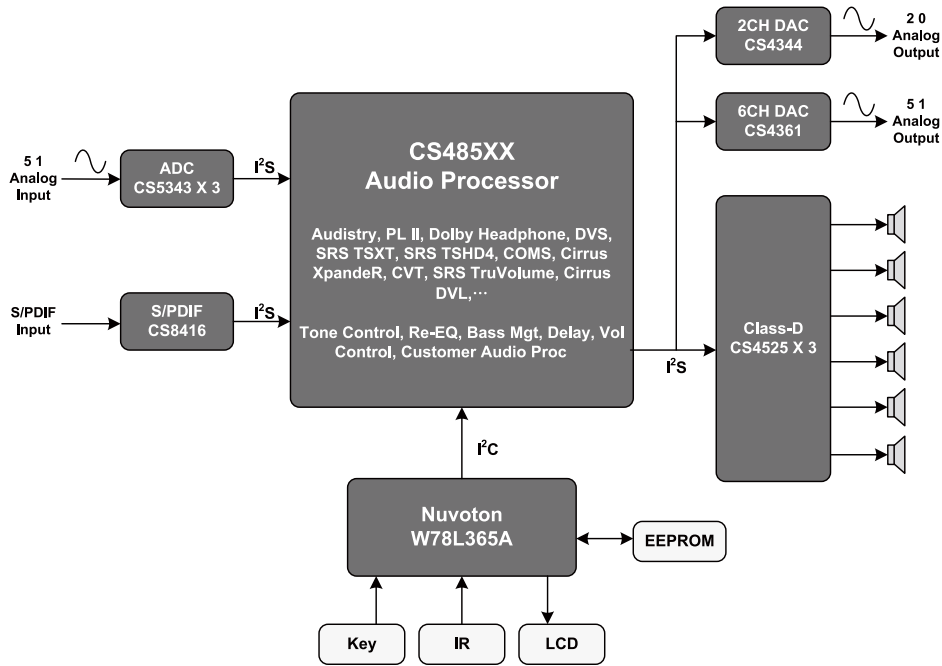
Product	Description	CobraNet® Part Numbers	Audio Channels over Ethernet	Serial Input/ Output Ports	Integrated DSP (MIPS)	Board Dimensions
CobraCom Ref Design	CobraNet microphone and networkpowered loudspeaker reference design	CRD-CobraCom Reference Design	16	Using the CS4961xx series provides up to 16 audio channels with audio DSP capability	32-bit DSP, 120 MIPS	5.4" X 4"
CobraNet LE Ref Design	Low-cost, 2 channel I/O end-node reference design	Available direct from Attero Tech <a href="http://www.atterotech.com">www.atterotech.com</a>	2	Stereo 1/8" input and output, stereo RCA input and output, I2S digital audio outputs		5" x 3"

### CobraNet Transport and Audio Network Processor ICs

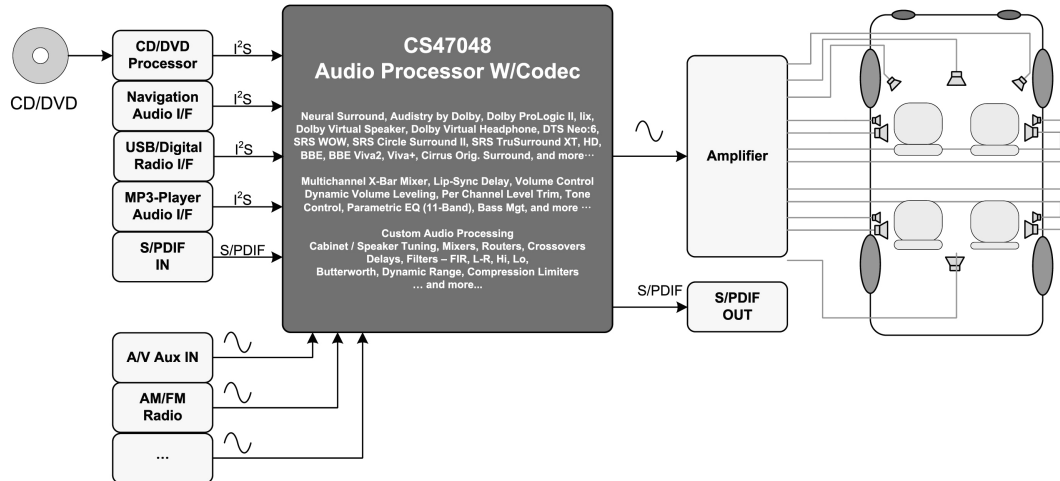
Family	Description	Part Numbers	Audio Channels over Ethernet	Serial Input/ Serial Output Ports	Ethernet Interface	Package
CS1810xx CS4961xx*	The CS1810xx Family contains CobraNet networked digital audio interface ICs. The CS4961xx Family provides digital audio signal processing along with the network interface function.	CS181002 CS496102*	2	One synchronous, capable of supplying up to 2 full-duplex channels at 48 and/or up to 96 kHz sample rates.	Supports 100BASE-Tx, 100 Mbps, full duplex Ethernet, fully compliant with IEEE 802.3u.	144 LQFP
		CS181012 CS496112*	8	Quad synchronous, capable of supplying up to 8 full-duplex channels at 48 and/or up to 96 kHz sample rates.		
		CS181022 CS496122*	16	Quad synchronous, capable of supplying up to 16 full-duplex channels at 48 kHz, or up to 8 channels at 96 kHz sample rates.		

\*The CS4961xx series includes a 32-bit, 120 MIPS digital signal processor for audio processing of any or all channels.

• **Cirrus Logic 应用框图 (Application Block Diagrams)**



**Lestina Sound Bar Solution Block Diagram**

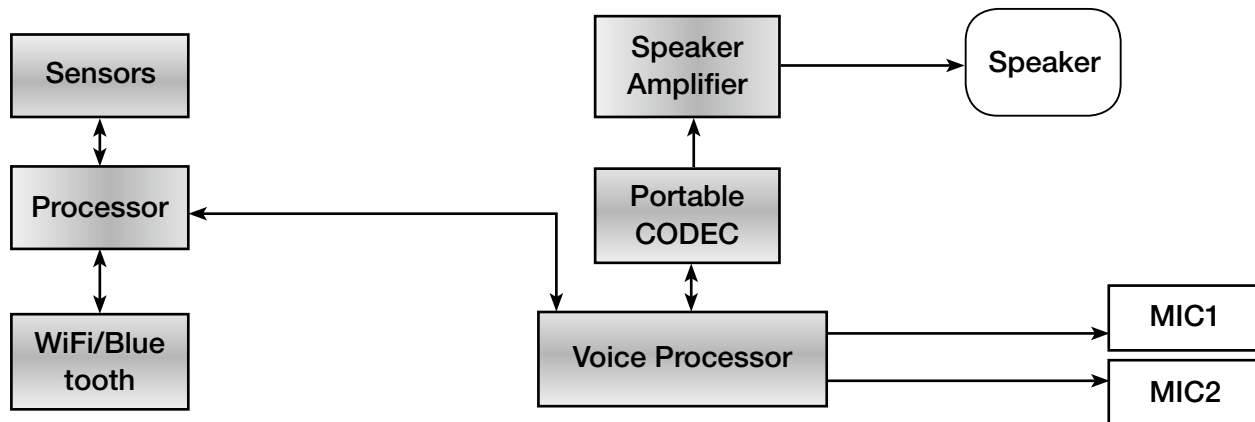


**Car Audio System with CS47048 Block Diagram**

### Smart Home Automation

- “Always on” voice
- ASR Enhance
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

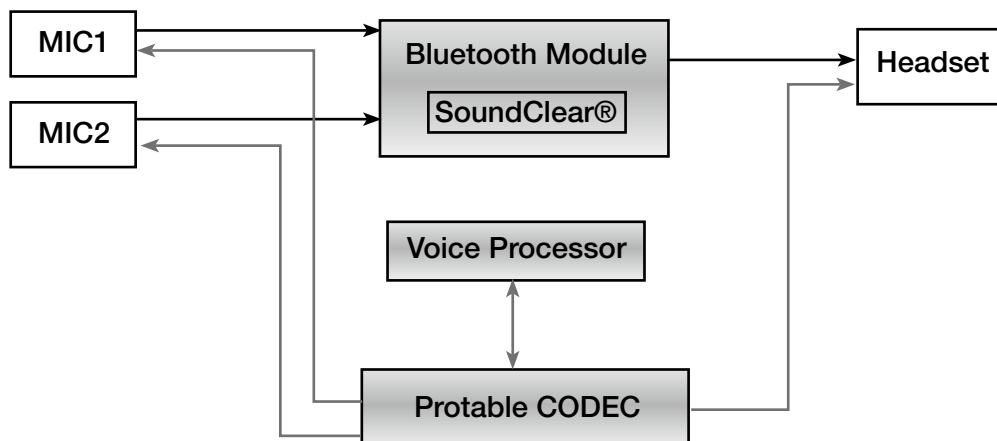
Voice Processors /DSPs: (CS48LV12/13 CS48L20)  
 Portable Codecs: (CS42L51/52 WM8962/8962B WM8993/8996)  
 MEMS Microphones: (WM7138 Analog, Bottom/WM7216 Digital, Top/WM7236 Digital, Bottom)  
 Class-D speaker Amplifiers: (CS35L00/01/03)



### Bluetooth Headset

- 2-mic Instant Adapt™ NREC
- Wind block, wind noise reduction
- Spectrally matched comfort noise
- ASR Enhance
- Ultra low power

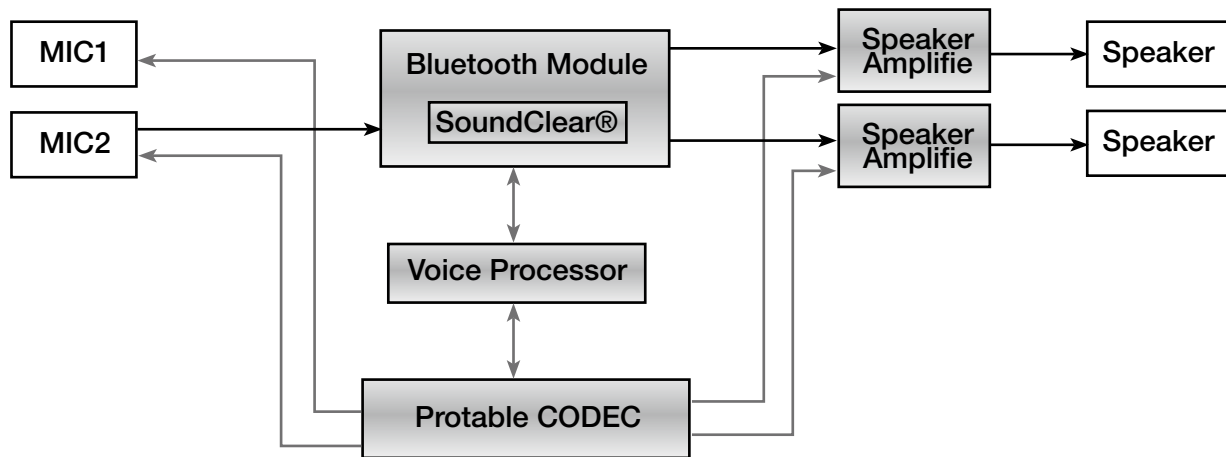
Voice Processors: (CS48LV12/13)  
 Portable Codecs: (WM8903/8904)  
 MEMS Microphones: (WM7331 Analog, Bottom)  
 Sound Clear® Embedded Software: (ATS7001/02)



### Bluetooth Speaker Box

- 2-mic Instant Adapt™ NREC
- 360° speakerphone pickup
- Superior echo cancelation
- ASR Enhance
- Ultra low power

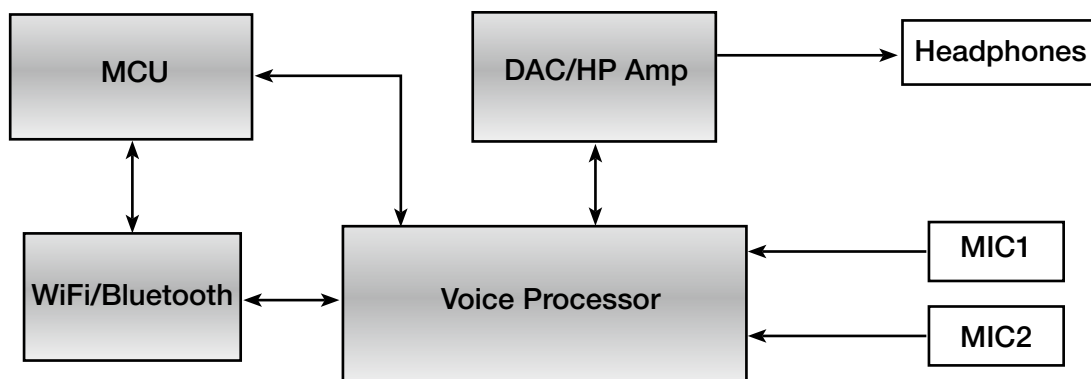
Voice Processors: (CS48LV12/13 CS48L20)  
 Portable Codecs: (CS42L51 WM8993/8996)  
 MEMS Microphones: (WM7138 Analog, Bottom/WM7216 Digital, Top/WM7236 Digital, Bottom)  
 Sound Clear® Embedded Software: (ATS7101/8102)  
 Class-D speaker Amplifiers: (CS35L00/01/03)



### Voice Command Remote Control

- “Always on”Voice
- ASR Enhance
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

Voice Processors: (CS48LV12/13 CS48L20)  
 D/A Converters/ Headphone Amplifiers: (CS43L21 WM8912/8918)  
 MEMS Microphones: (WM7216 Digital, Top/WM7236 Digital, Bottom)



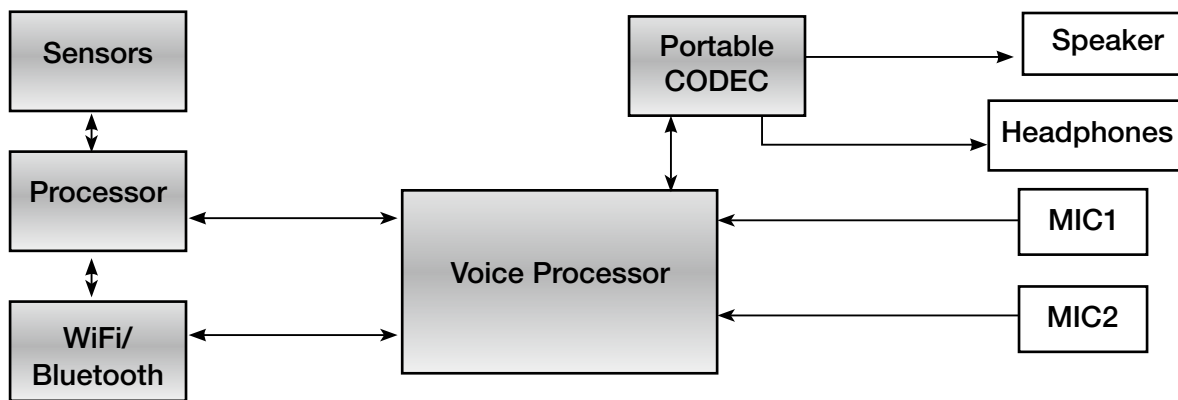
### Wearables (Bands, Watches, Glasses)

- “Always on”Voice
- ASR Enhance
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

Voice Processors: (CS48LV12/13 CS48L20)

Portable Codecs: (WM8903/8904/8993)

MEMS Microphones: (WM7216 Digital, Top/WM7236 Digital, Bottom/WM7331 Analog, Bottom)



### Entry-Level Soundbar

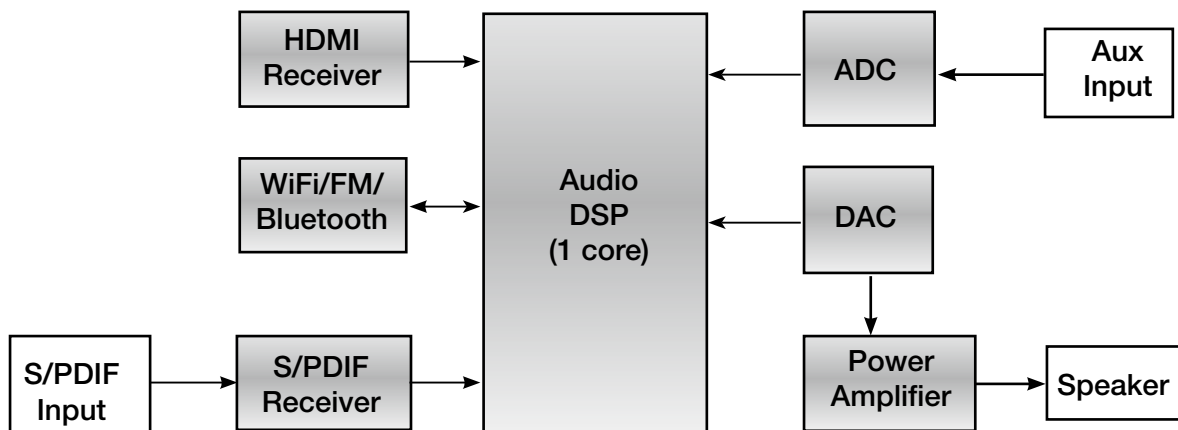
- High performance analog
- Dolby Digital decode
- Dolby and DTS enhance
- Audio post processing
- S/PDIF RX interface

Audio DSPs: (CS48L10/11)

A/D Converters: (CS5343/46)

D/A Converters: (WM8501/8524)

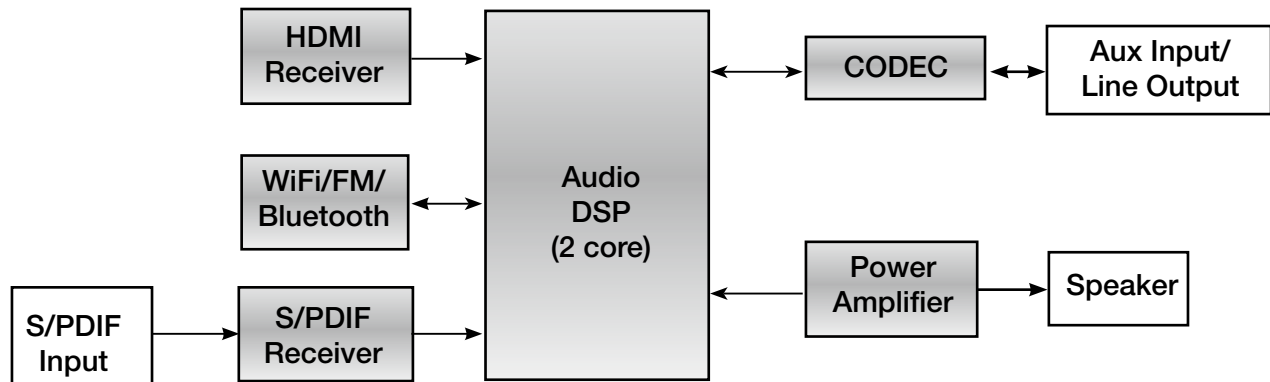
S/PDIF Interface: (CS8422 WM8804/8805)



### Mid-Tier Soundbar

- High performance analog
- Dolby and DTS decode/enhance
- Dolby Digital Plus, DTS SS II 5.x
- Audio post processing
- S/PDIF RX interface

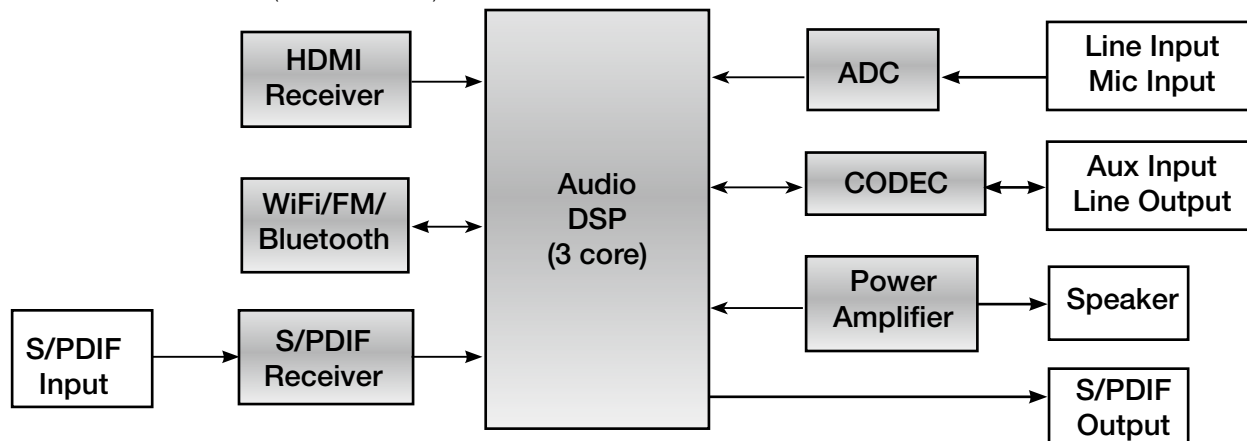
Audio DSPs: (CS48L20)  
 Codecs: (CS4270/72 WM8776)  
 S/PDIF Interface: (CS8422 WM8805)



### High-End Soundbar

- High performance analog
- Dolby and DTS decode/enhance
- Dolby True HD, DTS M8, THX
- Superior MIPS and on-chip memory
- Integrated S/PDIF TX interface

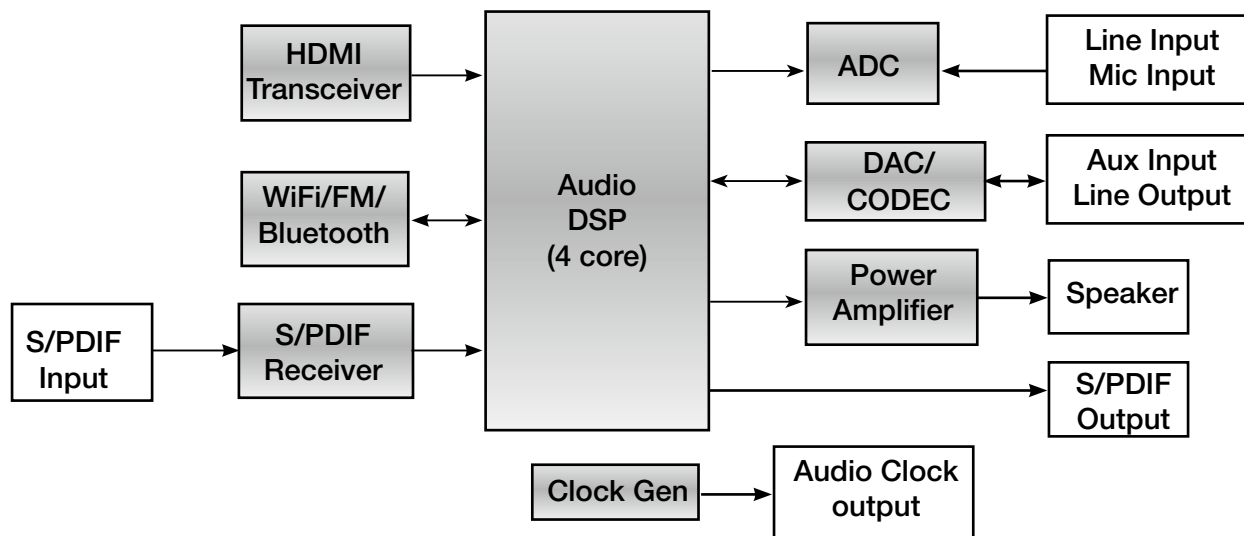
Audio DSPs: (CS49834)  
 Codecs: (CS4270/72 CS42528 WM8776)  
 S/PDIF Interface: (CS842 WM8805)  
 A/D Converters: (CS5343/46/81)



### Audio/Video Receivers

- High performance analog
- Dolby and DTS decode/enhance
- Dolby ATMOS, DTS UHD, THX
- Superior MIPS and on-chip memory
- Integrated S/PDIF TX interface

Audio DSPs: (CS49844)  
 Codecs: (CS4270/4272/42528/WM8776)  
 A/D Converters: (CS5346/5381)  
 D/A Converters: (CS4365/4385/4398/WM8741)  
 S/PDIF Interface: (CS8422/WM8805)  
 Clock Generation: (CS2000)

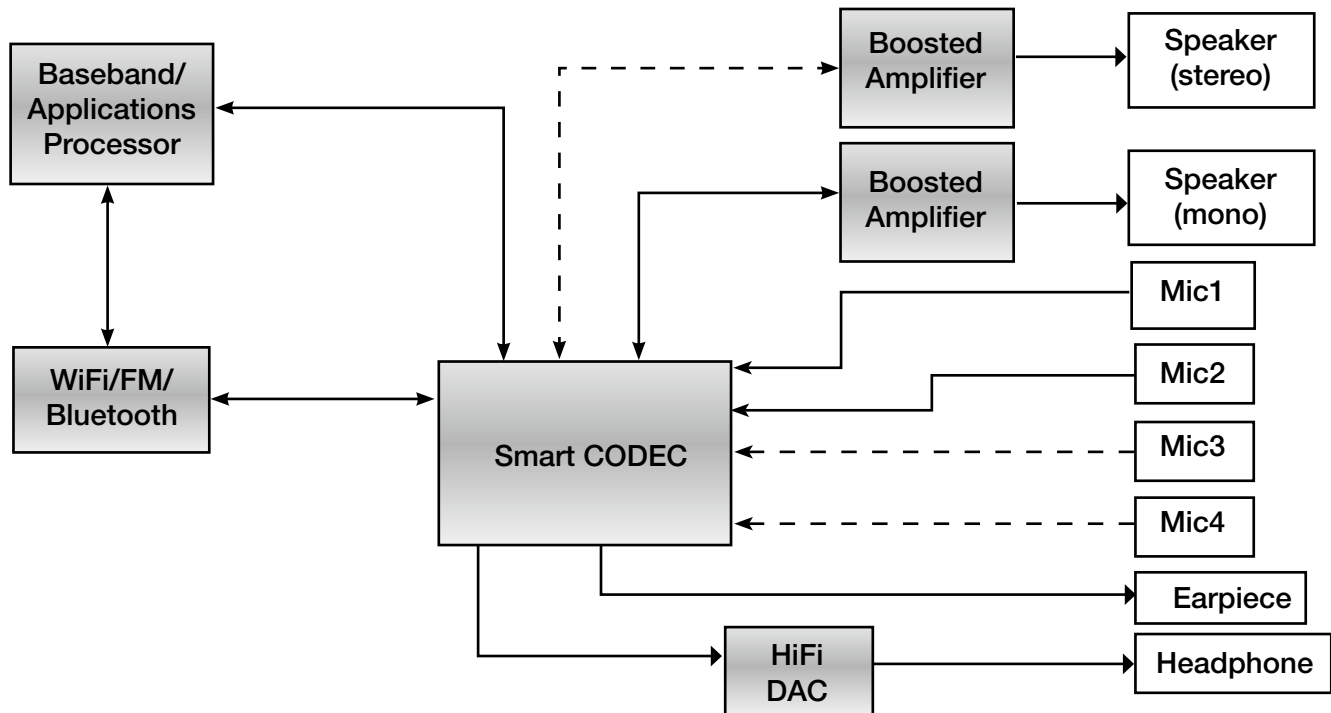


### Flagship Smartphone

- Low power, "always on" voice trigger
- Up to 600MIPS multi-core DSP
  - 3-mic voice (HP/SPK) TX noise reduction
  - RX earpiece ANC and stereo ANC
- Speaker protected Class-D amplifier

SoundClear Software: (WM8281/WM5102S)  
 Smart Codecs: (WM8281/WM5102S)  
 Boosted Amplifiers: (CS35L33)  
 HiFi D/A Converters: (CS4398/WM8741)  
 MEMS Microphones: (WM7121P/7216/7236)





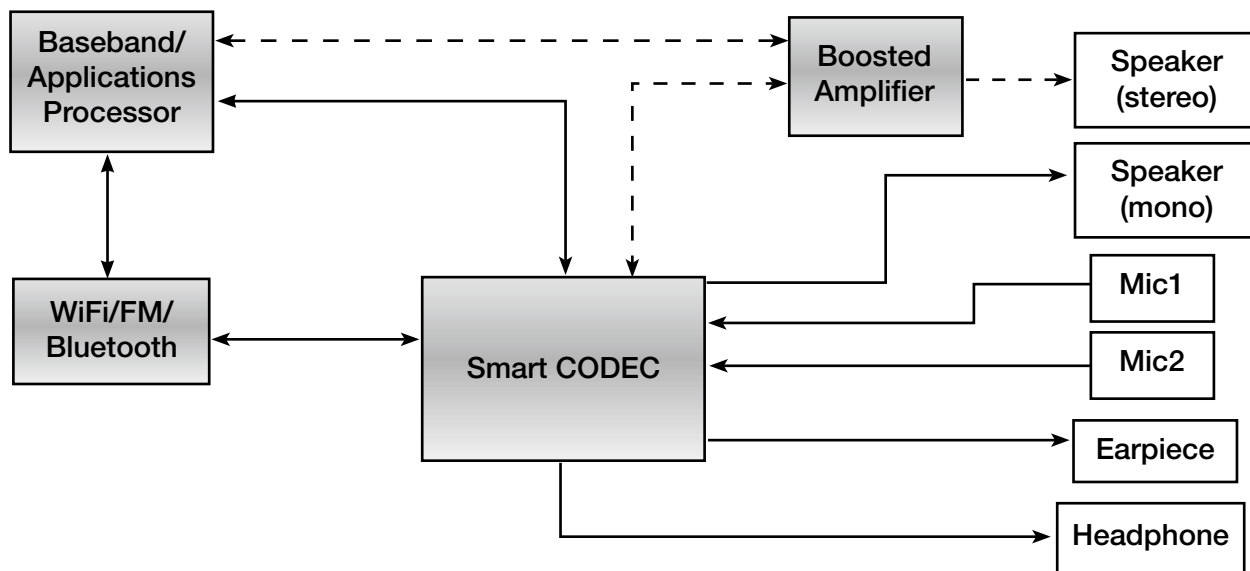
### Mid-Tier Smartphone

- High performance audio
- Smart accessory
- Low power sleep mode
- Digital microphone interface
- Boosted amplifier with speaker protection

Portable Codecs: (WM8998/1811/CS42L73)

Boosted Amplifiers: (CS35L32/33)

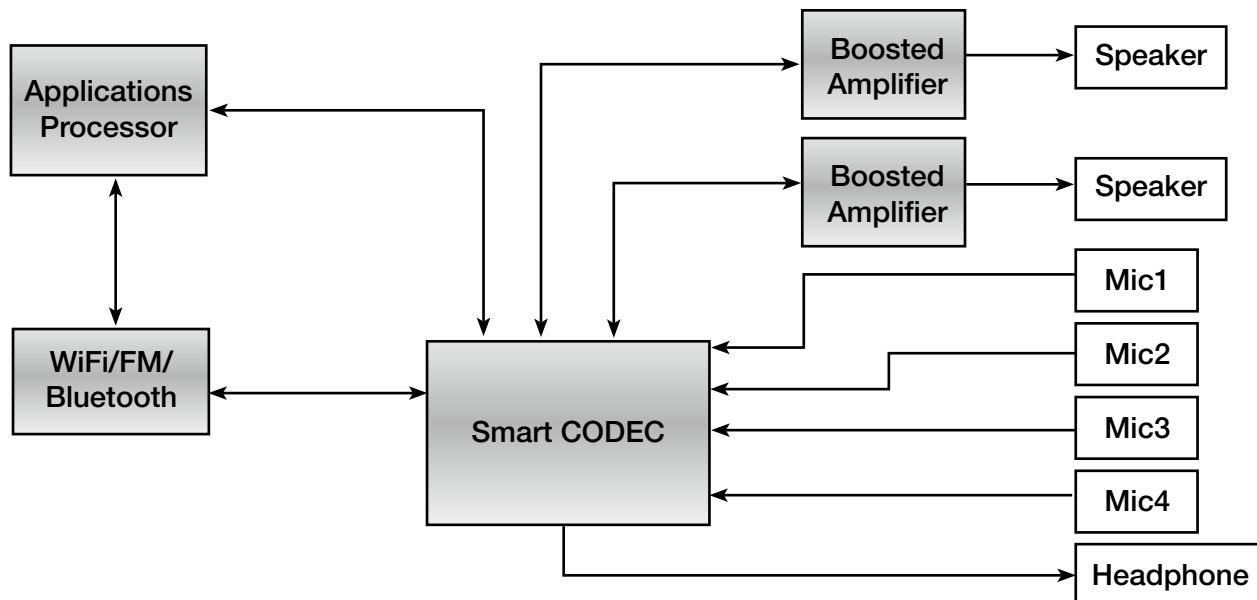
MEMS Microphones: (WM7216/7236/7331)



### Pro Tablet

- Low power, "Always on" voice trigger
- Up to 600MIPS multi-core DSP
  - 3-mic voice (HP/SPK) TX noise reduction
  - RX earpiece ANC and stereo ANC
- Speaker protected Class-D amplifier

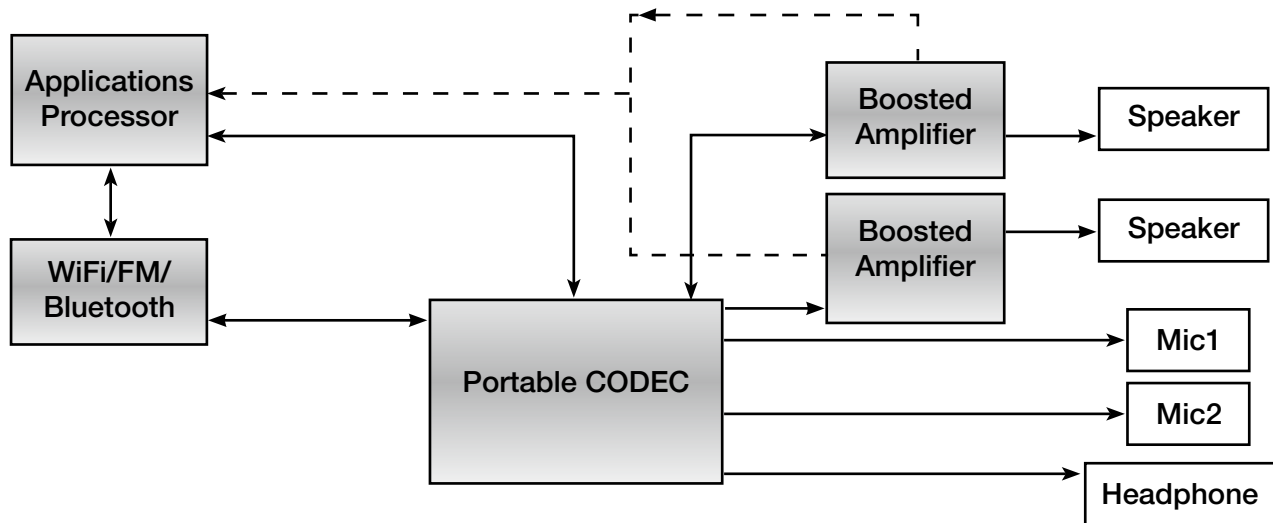
SoundClear Software: (WM8281/WM5102S)  
 Smart Codecs: (WM8281/WM5102S)  
 Boosted Amplifiers: (CS35L33)  
 HiFi D/A Converters: (CS4398/WM8741)  
 MEMS Microphones: (WM7121P/7216/7236/7132P)



### Media Tablet

- High performance audio
- Smart accessory
- Low power sleep mode
- Digital microphone interface
- Boosted amplifier with speaker protection

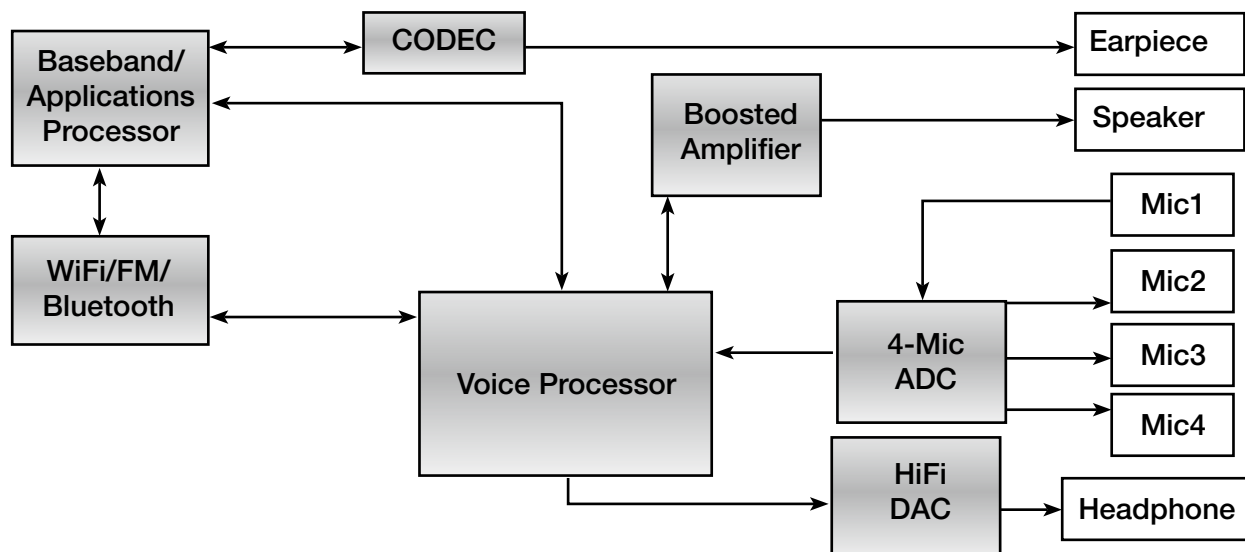
Portable Codecs: (WM8998/1811/CS42L73)  
 Boosted Amplifiers: (CS35L32/33)  
 MEMS Microphones: (WM7211/7230/7331)



### Voice Processor Sub-system

- Best user experience on Smartphones and tablets
- “Always on” Voice and ASR Enhance
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

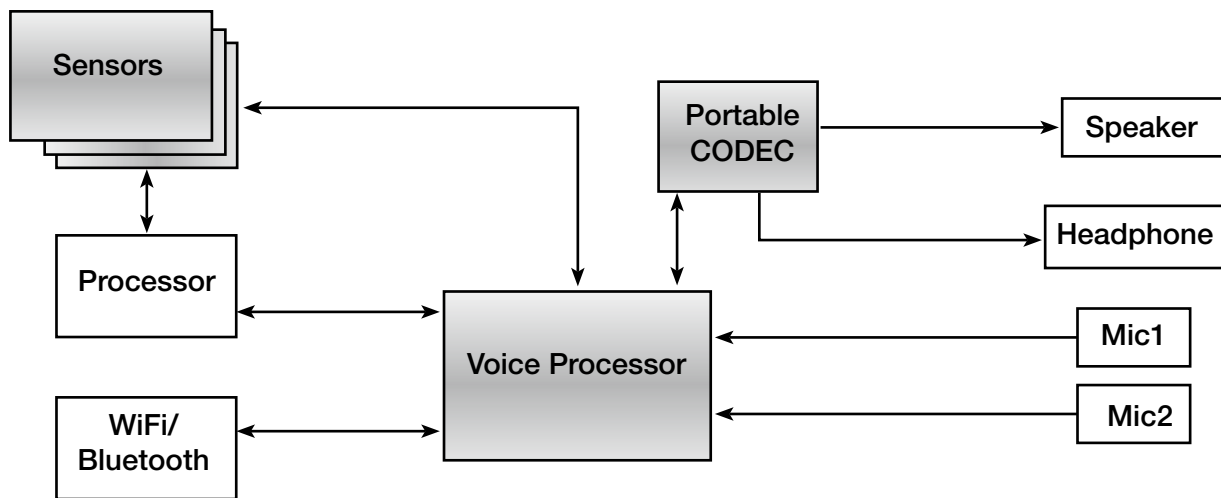
SoundClear Software: (CS48LV12/13/20)  
 Voice Processor/DSPs: (CS48LV12/13/20)  
 Boosted Amplifiers: (CS35L33)  
 HiFi D/A Converters: (CS4398/WM8741)  
 Multi-Mic A/D Converters: (CS53L30)  
 MEMS Microphones: (WM7138/7216/7236)



### Wearables(Band,Watch,Glasses

- “Always on” Voice
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

SoundClear Software: (CS48LV12/13/20)  
 Voice Processor/DSPs: (CS48LV12/13/20)  
 Portable Codecs : (WM8903/8904/8993)  
 MEMS Microphones: (WM7331/7216/7236)



### Delta Sigma A/D Converters

Part	Resolution (bits)	Throughput (Sps)	Integral Linearity (%FS)	Differential Linearity ( $\pm$ LSB)	Number of Channels	Power Consumption (mW)	Package
CS5505	16	20 100	0.0015 %	0.25	4	3.2	24 PDIP
							24 SOIC
CS5506	20	20 100	7.0E-4 %	NMC	4	3.2	24 PDIP
							24 SOIC
CS5507	16	20 100	0.0015 %	0.25	1	3.2	20 PDIP
							20 SOIC
CS5508	20	20 100	7.0E-4 %	NMC	1	3.2	20 PDIP
							20 SOIC
CS5509	16	20 200	0.0015 %	0.25	1	1.7	16 PDIP
							16 SOIC
CS5510	16	53 212	0.0015 %	NMC	1	1.4	8 SOIC
CS5511	16	100	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 PDIP
							20 SSOP

**Delta-Sigma A/D Converters with Integrated Amplifiers**

Part	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 PDIP
							20 SSOP
CS5523	16	1 400	0.0015 %	NMC	4	6	24 SSOP
CS5524	24	1 606	7.0E-4 %	NMC	4	9	24 PDIP
							24 SSOP
CS5525	16	3 606	0.0015 %	NMC	1	9.4	20 PDIP
							20 SSOP
CS5526	20	3 606	7.0E-4 %	NMC	1	9.4	20 PDIP
							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

**High-Throughput Delta-Sigma A/D Converters**

Part	Resolution (bits)	Throughput (kSps)	Integral Linearity	Differential Non-Linearity	Number of Channels	Power Consumption (mW)	Package
CS5560	24	50	$\pm$ 5 ppm	0.1 LSB	1 Differential	90 Typ.	24 SSOP
CS5566	24	5	$\pm$ 5 ppm	0.1 LSB	1 Differential	20 Typ.	24 SSOP
CS5571	16	100	$\pm$ 8 ppm	0.1 LSB	1 Single-ended	85 Typ.	24 SSOP
CS5581	16	200	$\pm$ 8 ppm	0.1 LSB	1 Single-ended	85 Typ.	24 SSOP

**Power Measurement**

Part	ADC Converters)	Current Sensor Options	Active Energy Accuracy	Reactive Energy Accuracy	IRMS Accuracy	SNR (dB)	Serial Comm	Digital Outputs	VREF Drift (ppm/ $^{\circ}$ C)	Input Voltage (V)	Power Cons. (mW)	Package
CS5480	3	Shunt / CT / Rogowski	0.1% over 4000:1 dynamic range	0.1% over 4000:1 dynamic range	0.1% over 1000:1 dynamic range	80	SPI / UART	3x Configurable Outputs	25	3.3	13	24 QFN
CS5484	4	Shunt / CT / Rogowski	0.1% over 4000:1 dynamic range	0.1% over 4000:1 dynamic range	0.1% over 1000:1 dynamic range	80	SPI / UART	4x Configurable Outputs	25	3.3	13	28 QFN
CS5490	2	Shunt / CT / Rogowski	0.1% over 4000:1 dynamic range	0.1% over 4000:1 dynamic range	0.1% over 1000:1 dynamic range	80	UART	Single Configurable Output	25	3.3	13	16 SOIC

**Power Measurement**

Part	ADC Converters	Current Sensor Options	Active Energy Accuracy	Reactive Energy Accuracy	IRMS Accuracy	SNR (dB)	Serial Comm	Digital Outputs	VREF Drift (ppm/°C)	Input Voltage (V)	Power Cons. (mW)	Package
CS5451A	6	Shunt / CT	N/A	N/A	N/A	77	SPI	—	25	3 Analog; 3 Digital	23	28 SSOP
CS5463	2	Shunt / CT	0.1% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	21	24 SSOP
CS5464	3	Shunt / CT	0.1% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	25	28 SSOP
CS5467	4	Shunt / CT	0.1% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	0.2% over 1000:1 dynamic range	78	SPI	Energy Pulses	40	5 Analog; 3.3 / 5 Digital	25	28 SSOP

**Embedded Processors ARM9**

Part	Processor Speed (MHz)	Cache Data/Code	Ethernet MAC	PCMCIA Device	IDE/IF	USB Hosts	Display I/F	Graphics Engine	Math Crunch Engin
EP9301	166	16 K/16 K	√	—	—	2	—	—	—
EP9302	200	16 K/16 K	√	—	—	2	—	—	√
EP9307	200	16 K/16 K	√	—	—	3	√	√	√
EP9312	200	16 K/16 K	√	—	2	3	√	—	√
EP9315	200	16 K/16 K	√	√	2	3	√	√	√

**Amplifiers**

Part	Device	Supply Voltage (V)	Supply Current (mA)	VOS (μV)	VOS Drift (μV/°C)	eNOISE (nV/√Hz)	AOL min (dB)	Package
CS3001	Single	2.7 to 6.7	2.1	10	0.05	6	200	8 SOIC
CS3002	Dual	2.7 to 6.7	3.6	10	0.05	6	200	8 SOIC
CS3003	Single	2.7 to 5.25	1	2	0.05	17	150	8 SOIC
								8 QFN
CS3004	Dual	2.7 to 5.25	2	2	0.05	17	150	8 SOIC
								8 QFN
CS3011	Single	2.7 to 6.7	0.9	10	0.05	12	200	8 SOIC
CS3012	Dual	2.7 to 6.7	1.7	10	0.05	12	200	8 SOIC
CS3013	Single	2.7 to 5.25	0.5	10	0.05	22	135	8 SOIC
								8 QFN
CS3014	Dual	2.7 to 5.25	1	10	0.05	22	135	8 SOIC
								8 QFN