

Audio DAC Overview

Audio Portfolio

Texas Instruments' complete line of audio products feature over 2000 devices within our DAC, ADC, CODEC, AMP, Line driver, Interface, USB Audio, and other product families.

ADC		AMP		CODEC		DAC		Smart AMP	
HW / SW Controlled		Stereo/Mono Class AB & D w/Boost		Power and Performance Optimized		Current Output, Voltage Output, 2VRMS Output, Delta Sigma		Low and Mid Power Amplifiers with Smart Speaker Protection	
1.8-3.3-5V Power		Analog Input		Integrated Amplifiers		Integrated Amplifiers		Integrated IV Sense, Excursion and Temp sensing options	
Audio PLL		Low Power options w/ PurePath™		Integrated DSP		DSP integration			
Energy Sense									
#ADC	1-4	Inputs	1-6	#ADC/DAC	0-6 / 1-8	#DAC	1-8	Output	7.5 – 50W
SNR	92-123dB	Output Power	0.35-400W	ADC/DAC SNR	72-112dB	SNR	92-127dB	PSRR	75 dB
PWR	17-600mW			PWR	6.7mw +	THD (%)	0.0004-0.04	Inputs	Analog/Dig.
Packages: 5.3 - 144mm ²		Packages: 2 - 517mm ²		Packages: 7.8 - 170mm ²		Packages: 6.4 - 144mm ²		Packages: 7.5 - 76mm ²	
1K: \$0.80 - \$8.55		1K: \$0.26 - \$10.75		1K: \$1.23 - \$19.25		1K: \$0.89 - \$11.18		1K: \$1.39 - \$3.75	

Audio DAC Features

- **High performance Audio DACs**
 - Delta-Sigma
 - Up to 132dB Signal to Noise Ratio
- **Multiple Channel Solutions**
 - From 2 to 8 Channels
- **On-chip Processing Options**
- **Flexible Control**
 - Hardware and/or Software Controlled
 - I2C/SPI
- **Integrated PLL and LDO Options**
 - Reduce system cost
- **Numerous Integrated features**
 - Oversampling, filters, mute,
- **Multiple packaging options**
 - as small as 16mm²
 - TQFP & TSSOP



EXISTING

NEW

ROADMAP

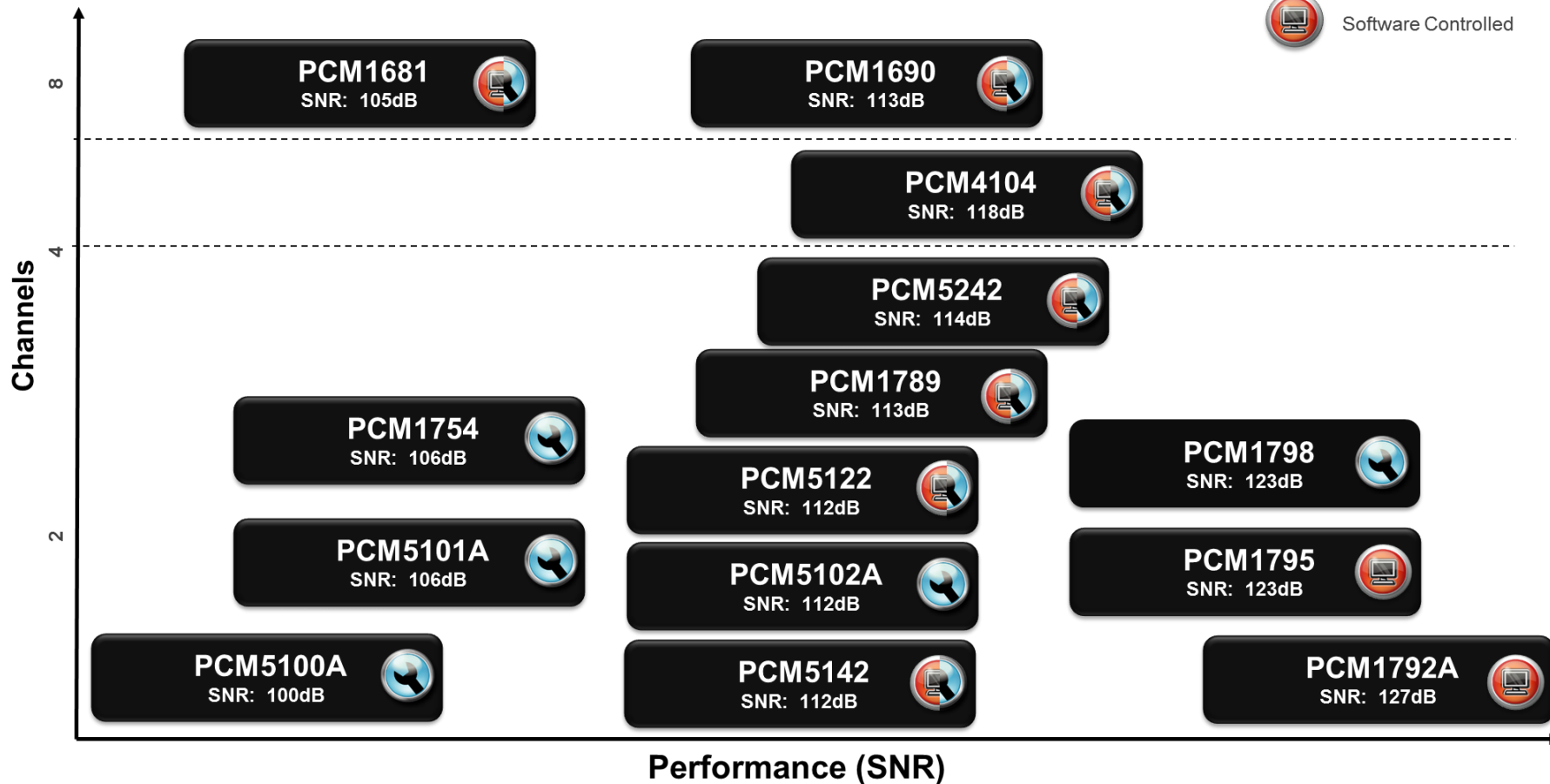
Audio DACs



Hardware Controlled








Software Controlled



Additional DAC solutions are available. These are our most popular!

PCM17xx Series

	SNR (dB)	THD	Control	Inputs	Supply Voltage	Package
PCM1798 	123	-106	H/W	R, I2S, L	$V_{CC}: 5V$ $V_{DD}: 3.3V$	SSOP : 5 x 10mm
PCM1795 	123	-106	S/W, I2C, SPI, TDM	R, DSD, I2S, L	$V_{CC}: 5V$ $V_{DD}: 3.3V$	SSOP : 5 x 10mm
PCM1792A 	127	-108	S/W I2C, SPI	R, DSD, I2S, L	$V_{CC}: 5V$ $V_{DD}: 3.3V$	SSOP : 5 x 10mm
PCM1789 	113	-94	H/W & S/W I2C, SPI	R, I2S, L, DSP	$V_{CC}: 5V$ $V_{DD}: 3.3V$	SSOP : 4 x 8mm
PCM1754 	106	-94	H/W	R, I2S, L	5V	SSOP : 4 x 5mm

Pin Compatible

SBA – Stop-Band Attenuation

PCM179x

High Performance 24-bit Stereo Audio DACs

Features

- 2x DAC with 24-bit, 200KHz PCM interface
 - SNR: Up to 127dB / THD + N: up to -108dB
- I/F for optional external Digital Filter/DSP
- User Programmable Functions (PCM1795/1792A)
- Direct Stream Digital (DSD) Interface

Benefits

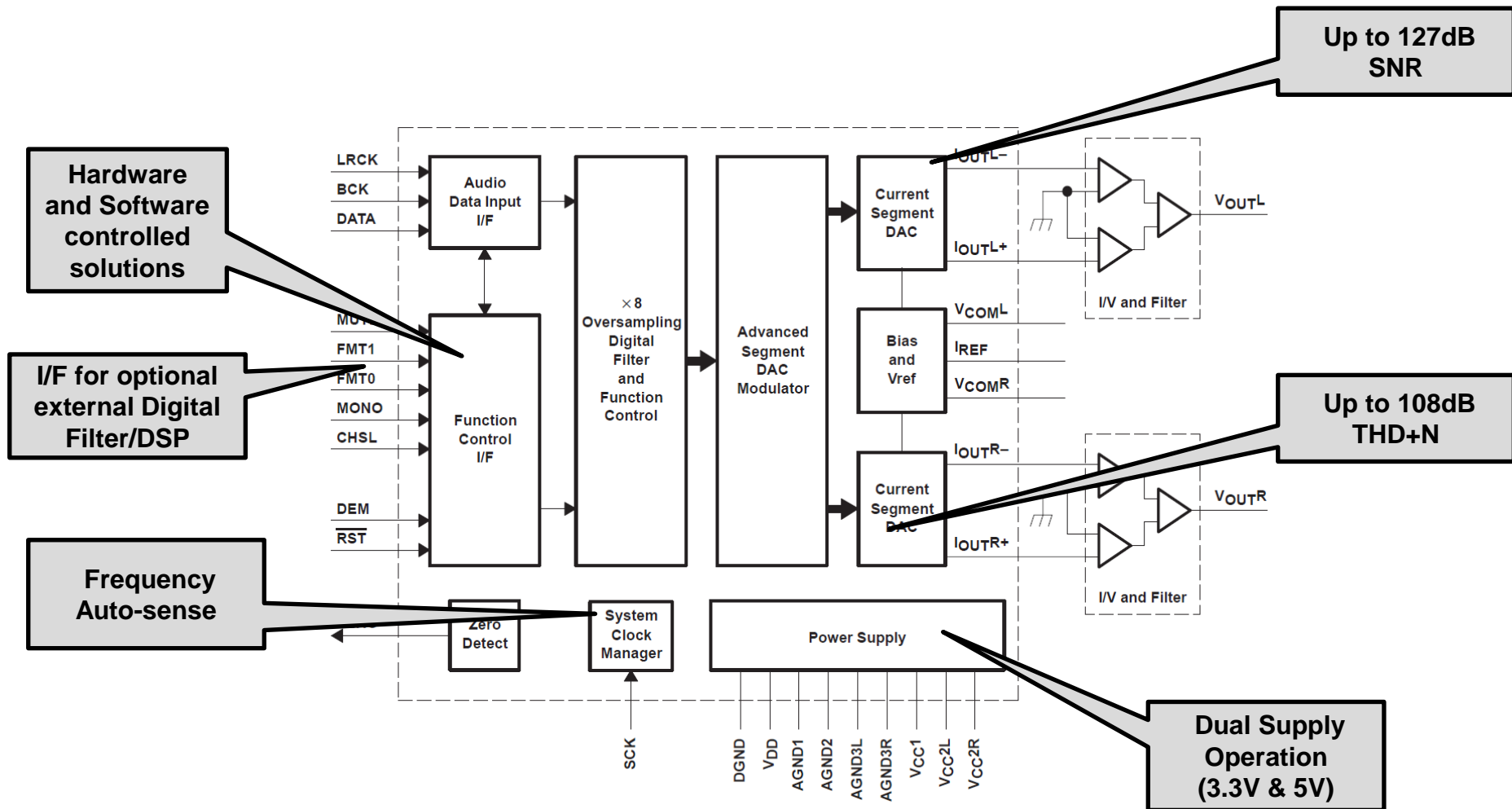
- Highest performing DACs in industry
- TI Companion DF1706 for highest performance
- Attenuation, De-Emphasis, Roll-off, Mute, Zero Flag
- Direct interface to DSD Decoders

Applications

A/V Receivers
Musical Instruments
Car Audio
Multitrack recorders
Professional Audio



PCM179x Block Diagram



PCM1789

High Performance 24-bit Stereo Audio DACs

Features

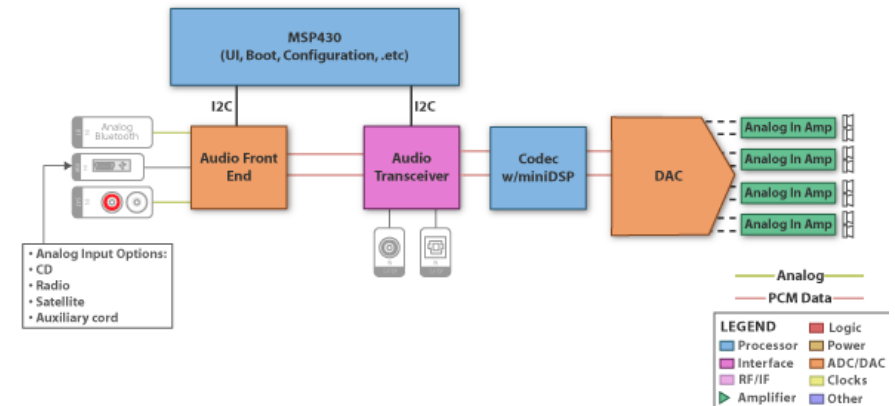
- 2x DAC with 24-bit, 192KHz PCM interface
 - SNR: 113dB / THD + N: up to -94dB
- Analog Mute Circuit with Clock Halt Detection
- Software or Hardware control
- Connect up to 4 devices on 1x SPI Bus

Benefits

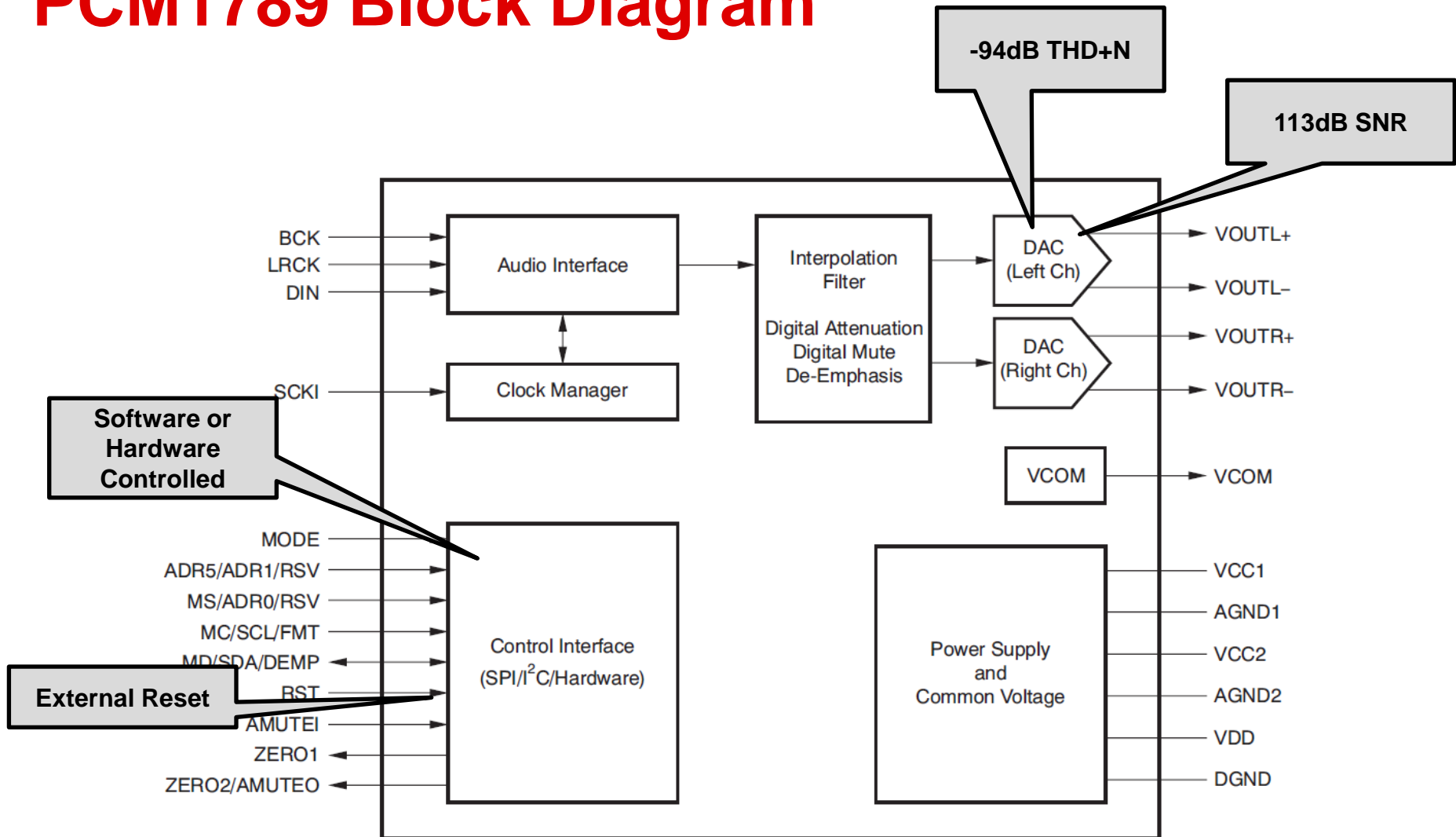
- Highest performing DACs in industry
- Reduce audible noise under unstable clock condition
- Configurable for any system
- Save number of DSP I/O ports

Applications

A/V Receivers
Navigation Systems
Car Audio
Multitrack recorders



PCM1789 Block Diagram



PCM1754

High Performance 24-bit Stereo Audio DACs

Features

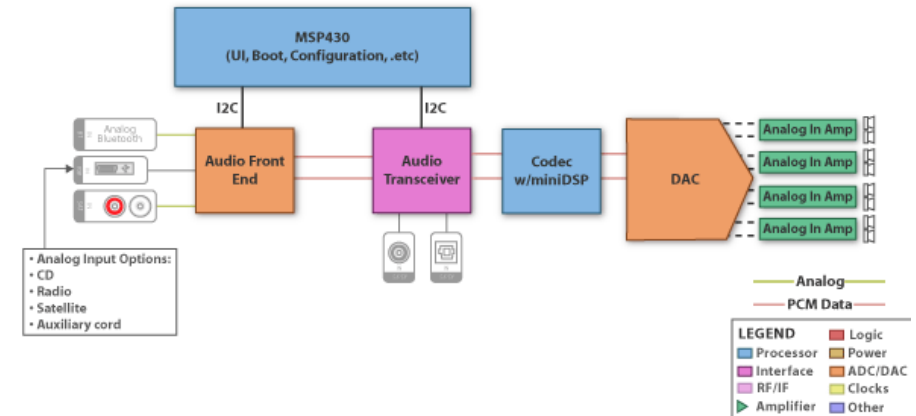
- 2x DAC with 24-bit, 192KHz PCM interface
 - SNR: 106dB / THD + N: up to -94dB
- 4th-order noise shaping and 8-level amplitude quantization
- Single 5V power supply
- Hardware Controlled

Benefits

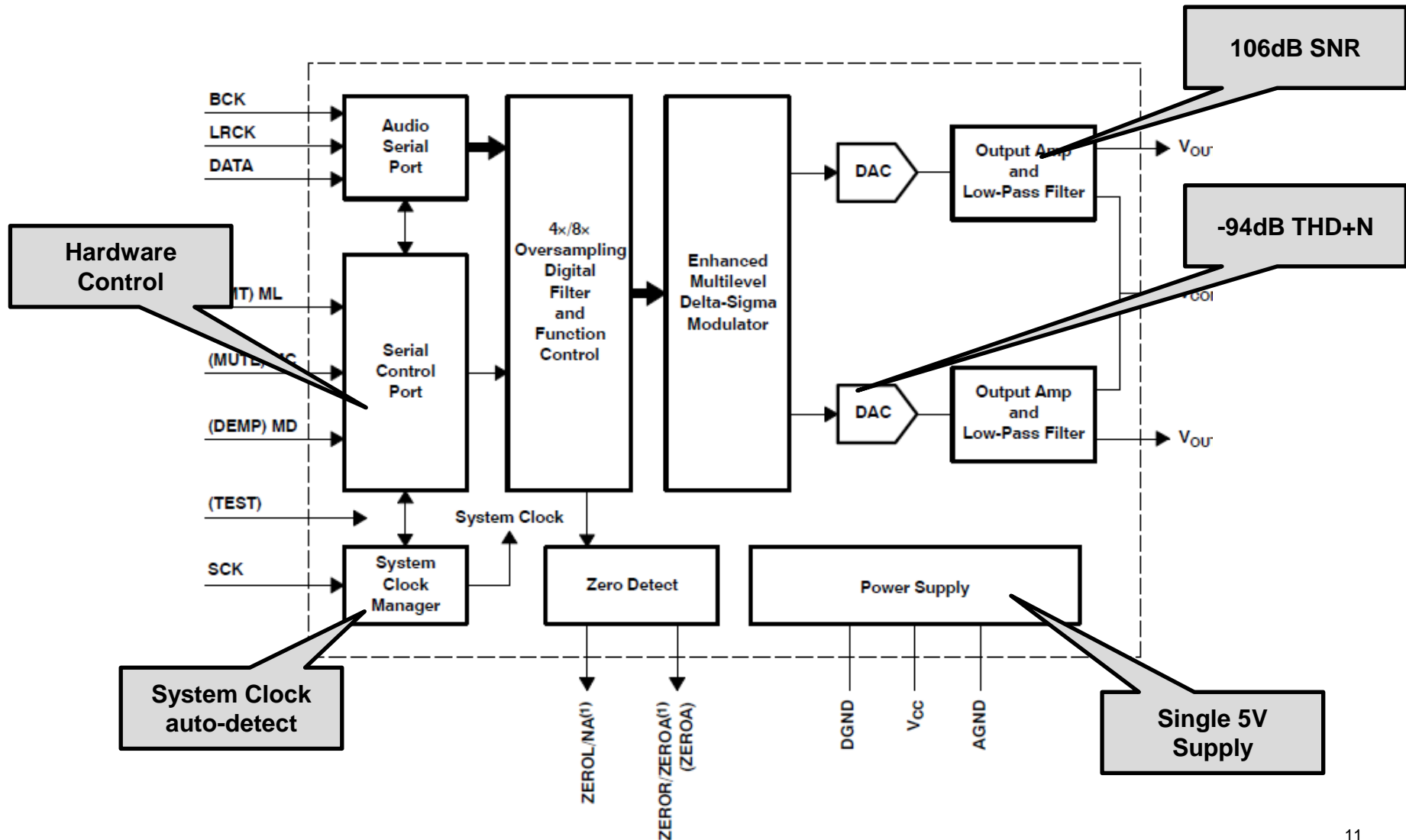
- High quality sound with good jitter performance
- Excellent dynamic performance and improved jitter tolerance
- Reduce system complexity/multiple power rails
- SW development costs reduced

Applications







A/V Receivers
Navigation Systems
Car Audio
Multitrack recorders



PCM1754 Block Diagram



PCM5xxx Series

	SNR (dB)	THD	Control	On-Chip Processing	DirectPath/ PLL	Package
 <p>PCM5242</p>	114	-94	H/W & S/W	Programmable/ Fixed	Yes	QFN : 32-pin 5 x 5mm
 <p>PCM5142</p>	112	-93	H/W & S/W	Programmable/ Fixed		SOP: 28-pin 4.4 x 9.7mm
 <p>PCM5122</p>	112	-93	H/W & S/W	Programmable/ Fixed		SOP: 28-pin 4.4 x 9.7mm
 <p>PCM5102A</p>	112	-93	H/W	None		SOP : 20-pin 4.4 x 6.5mm
 <p>PCM5101A</p>	106	-92	H/W	None		SOP : 20-pin 4.4 x 6.5mm
 <p>PCM5100A</p>	100	-90	H/W	None		SOP : 20-pin 4.4 x 6.5mm

PCM51xx

2V_{RMS} Stereo Audio DACs w/ DirectPath™

Features

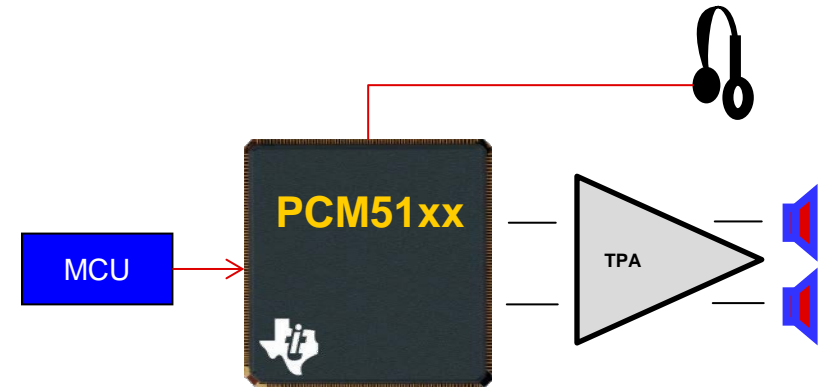
- 2x DAC with 32-bit, 384KHz PCM interface
 - SNR: Up to 112dB / THD + N: up to -93dB
- DirectPath output amplifier
- Integrated, programmable PLL
- Advanced Mute Circuitry w/ Analog Mute
- Clock halt detect
- On-Chip processing (PCM5142 Only)
- Register-Selectable Audio-Processing Functions (PCM5122 only)

Benefits

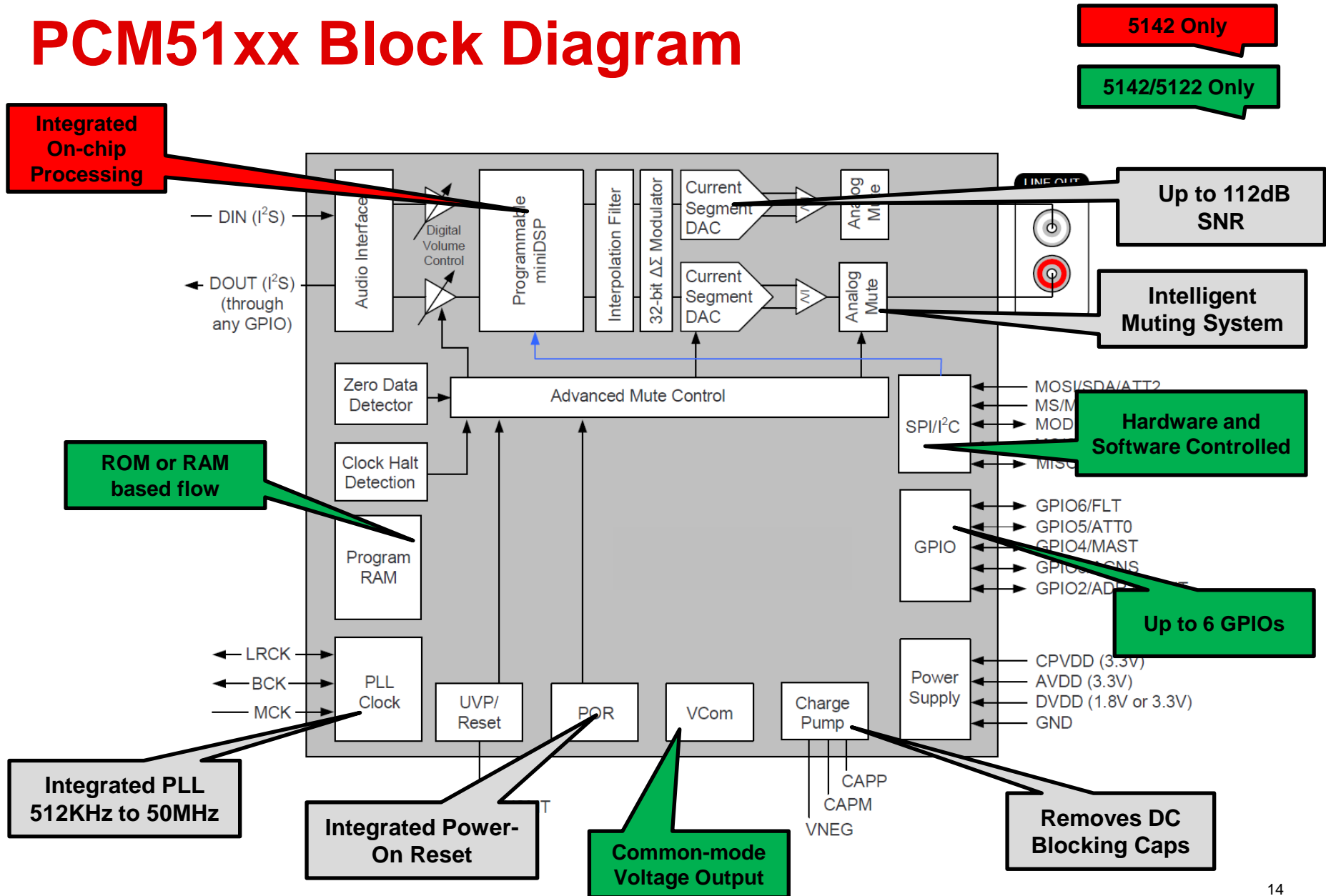
- Ultra-low out of band noise and jitter suppression
- Ground-centered headphone without need for DC blocking caps
- Configurable PLL simplifies board clock layout
- Zero Pop and Click when muting/unmuting
- Zero Pop and Click on source change
- Customers can custom configure the device for differentiation
- Frees up processing bandwidth

Applications

Set-Top Box
LCD TV
Soundbar
Home Theatre






PCM51xx Block Diagram



PCM16xx/41xx

4+ DAC Solutions

	DAC	SNR (dB)	THD+N (dB)	SW / HW Control	Outputs	Package
PCM1690 	8x	113	-94	SW & HW	8	PSO: 48-pin 12x8mm
PCM1681 		105			8	PSO: 28-pin 9x6mm
PCM4104 	4x	118	-100		4	QFP: 48-pin 9x9mm

PCM16xx

8-Channel, Enhanced Multi-Level $\Delta\Sigma$ Audio DAC

Features

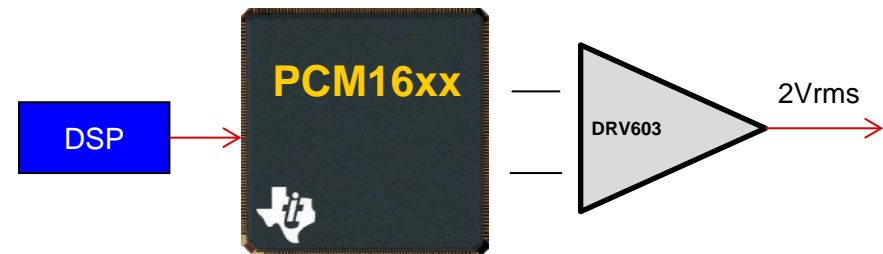
- 8x 24-bit Delta Sigma DACs
- SNR: Up to 113dB / THD + N: up to -94dB
- Software or Hardware controlled
- Analog Mute with clock halt detection

Benefits

- High performance audio
 - Better Jitter Sensitivity & PSRR
- Flexible control for any system
 - 2-8Ch configuration
- Reduce audible noise under unstable clock condition

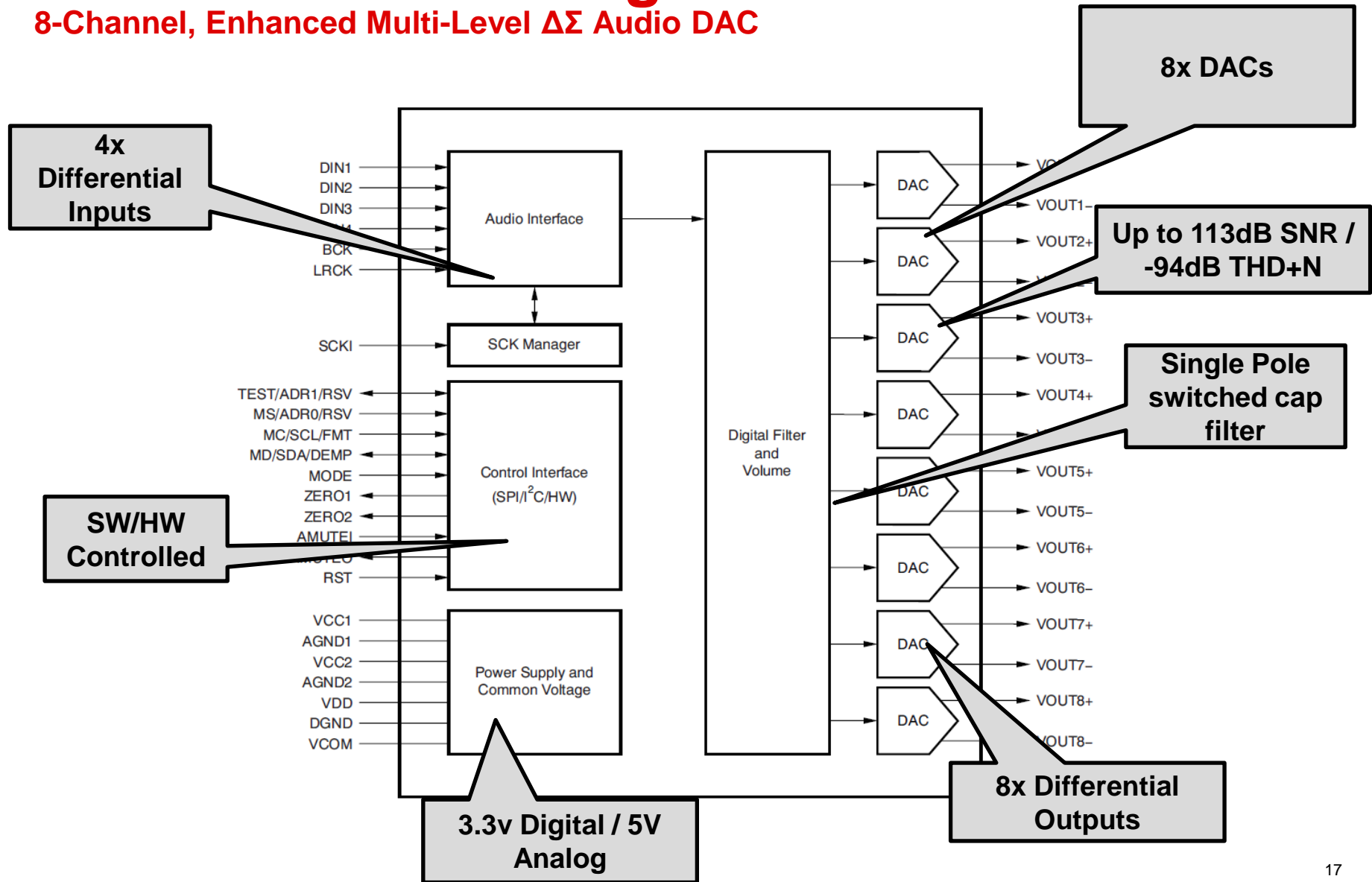
Applications

AV Amplifier/Receiver-HTiB
STB
Car Audio & Navigation
Professional Audio



PCM16xx Block Diagram

8-Channel, Enhanced Multi-Level $\Delta\Sigma$ Audio DAC



PCM4104

4-Channel, Enhanced Multi-Level $\Delta\Sigma$ Audio DAC

Features

- 4x 24-bit Delta Sigma DACs
 - SNR: Up to 118dB / THD + N: up to -100dB
- Software or Hardware controlled
- Soft mute Function
- Power Down Modes
- Cascading possible via TDM

Benefits

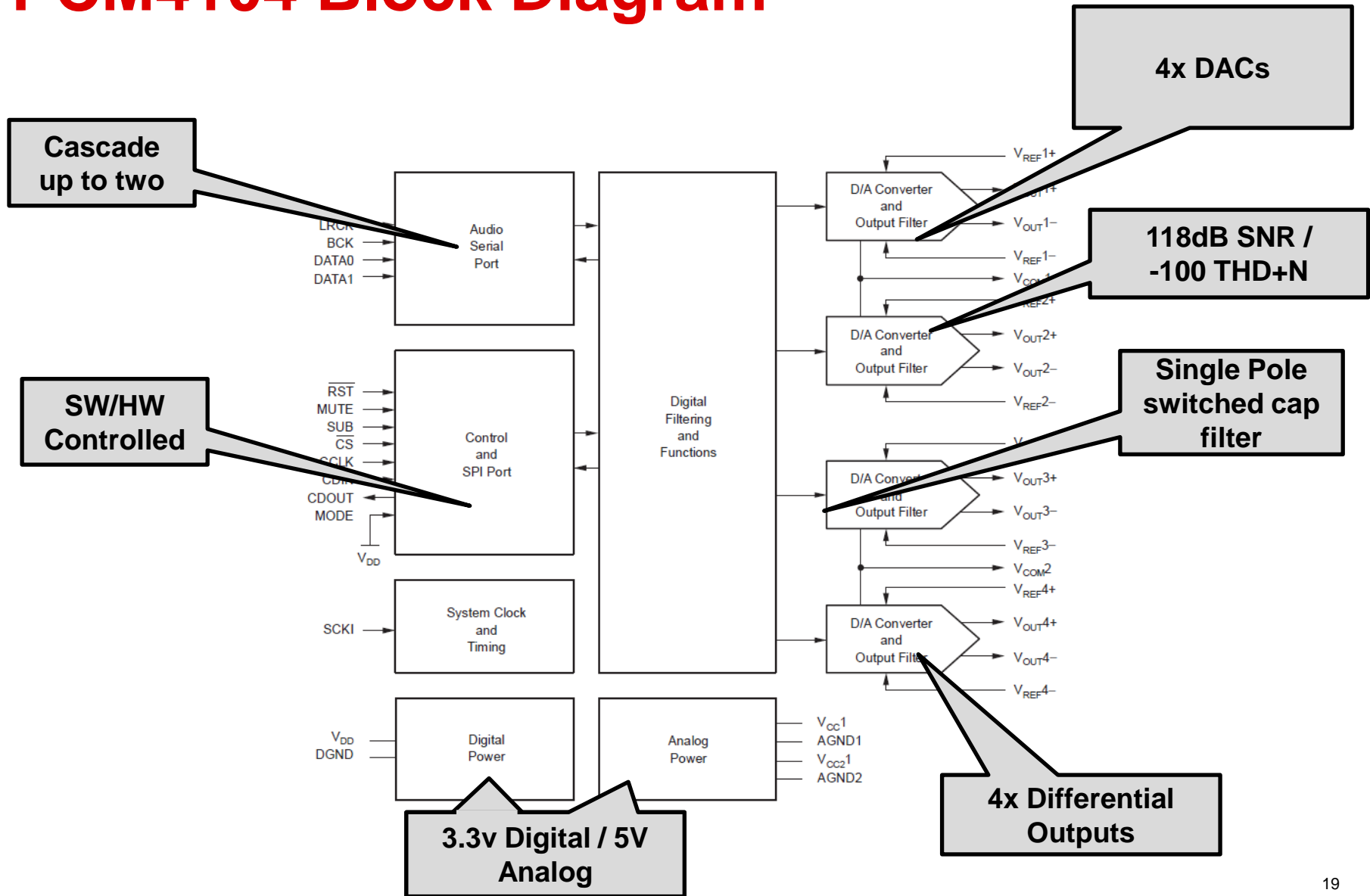
- High performance audio
- Dedicate Mute Pin or SW controllable
- Reduce system power consumption
- Board population options for performance requirements

Applications

AV Amplifier/Receiver-HTiB
STB
Car Audio & Navigation
Professional Audio



PCM4104 Block Diagram



R-E-D TODAY!

Research



www.ti.com/audio - Learn about all our audio products
Parametric Search - Intuitive comparison tool
Audio Selection Tool - Let us help narrow your options
Technical Documents - Datasheets, package info, etc

Evaluate



EVM & Development Kits - **Low cost, easy to use**
PurePath Software - **No Hassle, free software**
Training videos - **24/7, anytime, anywhere**
End Equipment Block Diagrams - **TI Companion devices**

Design



Audio Reference Designs -schematics, gerbers, etc.
Free Samples - Try before you buy (qty limits)
Models & Tools - IBIS, symbols, calculators and more
E2E Forum - Get support from TI experts & community

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