Data Converters/Audio

Automotive Data Converters/Audio Solutions

6-In/6-Out, 2-DAC/2-ADC, 100-dB/93-dB, 24-bit Audio CODEC with Integrated PLL & Embedded MiniDSP

TLV320AIC3254-Q1

The TLV320AIC3254-Q1 is a very flexible low power and low voltage stereo audio CODEC with integrated miniDSP.

The miniDSP can run advanced audio processing algorithms, like echo and noise cancellation, while offloading host processor. The miniDSP cores are fully software controlled.

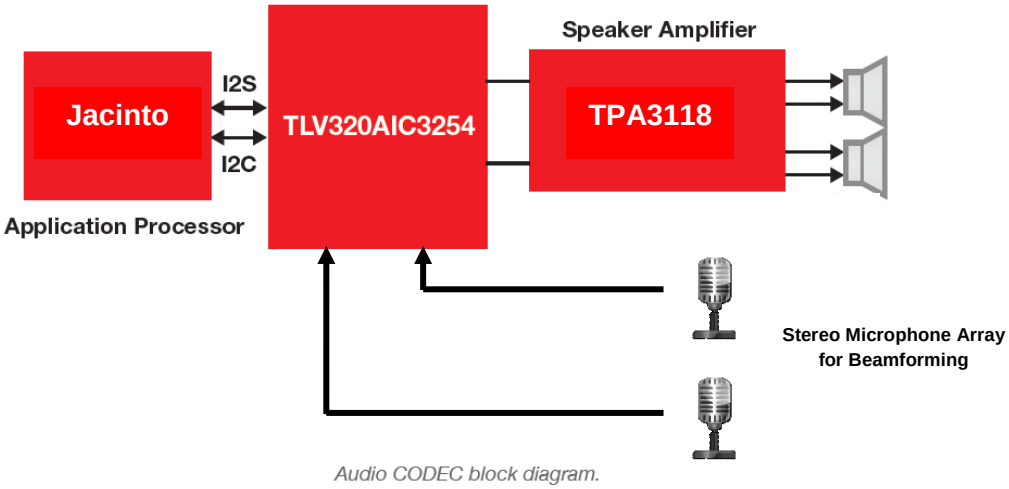
The 'AIC3254 supports PowerTune™ technology which lets the user set the power consumption vs. SNR trade-off under any usage model.

Digital microphone support is also provided for improved system level noise immunity. It has a PLL which accepts any input clock between 512 kHz - 50MHz and excellent SNR and THD performance.

In addition, amplifier functionality such as mic bias, pre-amp, and stereo headphone drivers are integrated in the codec, reducing solution size and parts count.

Key Features

- Stereo audio DAC with 100-dB SNR.
- Stereo Audio ADC with 93-dB SNR
- Embedded miniDSP
- Stereo headphone outputs.
- Stereo line outputs.
- Programmable microphone bias
- Programmable PLL



Audio CODEC block diagram.

Data Converters/Audio

Automotive Data Converters/Audio Solutions

112/106/100-dB, 2-ch, 32-bit, Ultralow Out-of-Band noise Audio DAC with 2.1-Vrms ground centered outputs and integrated PLL

PCM5102A-Q1/PCM5101A-Q1/PCM5100A-Q1

The PCM510xA-Q1 provides 2.1-VRMS ground centered outputs, allowing designers to eliminate DC blocking capacitors on the output, as well as external muting circuits traditionally associated with single supply line drivers.

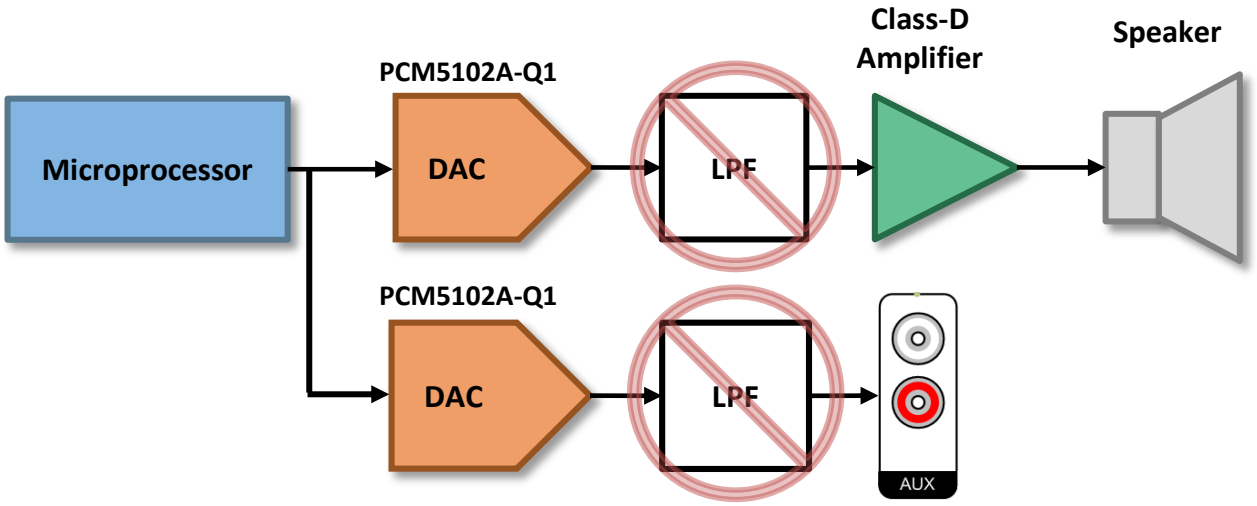
The integrated PLL on the device removes the requirement for a system clock (commonly known as master clock), allowing a 3-wire I2S connection and reducing system electromagnetic interference (EMI).

The PCM510xA-Q1 family of Audio DACs uses advanced current segment architecture to greatly reduce out-of-band noise, which could make the traditional 20kHz low-pass filter a thing of the past in many automotive audio systems.

The PCM510xA-Q1 family of Audio DACs offers up to 20-dB lower out-of-band noise, reducing EMI and aliasing in downstream amplifiers and analog-to-digital converters (ADCs) from traditional 100-kHz OBN measurements all the way to 3 MHz.

Key Features

- No DC blocking capacitors required.
- Ultra-Low Out-of-Band Noise; no Low Pass Filter required
- 2.1-Vrms ground centered outputs
- Integrated PLL
- Single 3.3V supply



Audio Amplifiers/Audio

Automotive Audio Amplifiers/Audio Solutions

1-Ch, Analog Input Automotive Class-D Audio Amplifier with Load Dump and I2C Diagnostics

TAS5421-Q1

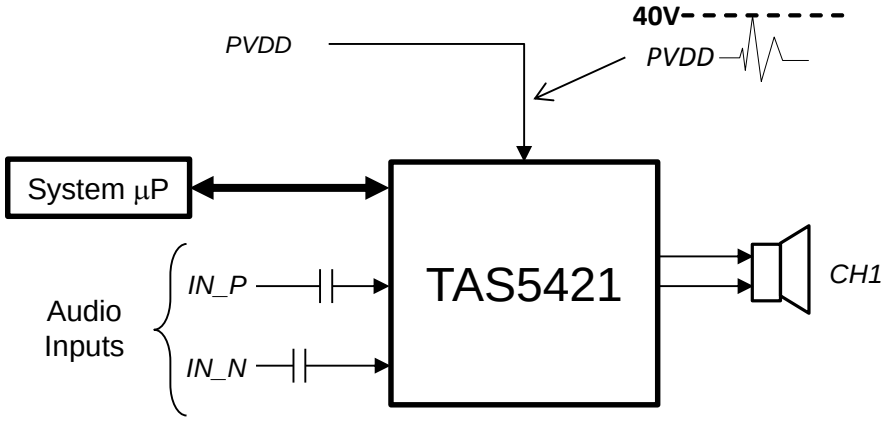
The TAS5421-Q1 is a mono digital audio amplifier, ideal for use in automotive emergency call (eCall), telematics, instrument cluster, and infotainment applications.

The TAS5421-Q1 provides 4-W Output Power into 4 Ω at less than 10% THD+N from a 5-Vdc supply (and up to 22 W into 4 Ω at less than 10% THD+N from a 14.4-Vdc automotive battery). The wide operating voltage range and excellent efficiency make the device ideal for start-stop support or running from a backup battery when required.

TAS5421-Q1's integrated load-dump protection reduces external voltage clamp cost and size, and the onboard load diagnostics report the status of the speaker through I2C.

Key Features

- Mono Class-D Audio Amplifier
- 4-W Output Power at 5V at 10% THD+N
- 22-W Output Power at 14.4V at 10% THD+N
- 4.5-V to 18-V Operating Range
- Differential Analog Input
- Load Diagnostic Functions:
  - Open and Shorted Output Load
  - Output-to-Power and -Ground Shorts
- Protection and Monitoring Functions:
  - Short-Circuit Protection
  - 40-V Load Dump Protection



Data Converters/Audio

Automotive Data Converters/Audio Solutions

110-dB/103-dB, 4-ch, 4-ADCs, 24-bit Audio ADC with Universal Front End, I2C or SPI control, and integrated PLL

PCM1865/PCM1864

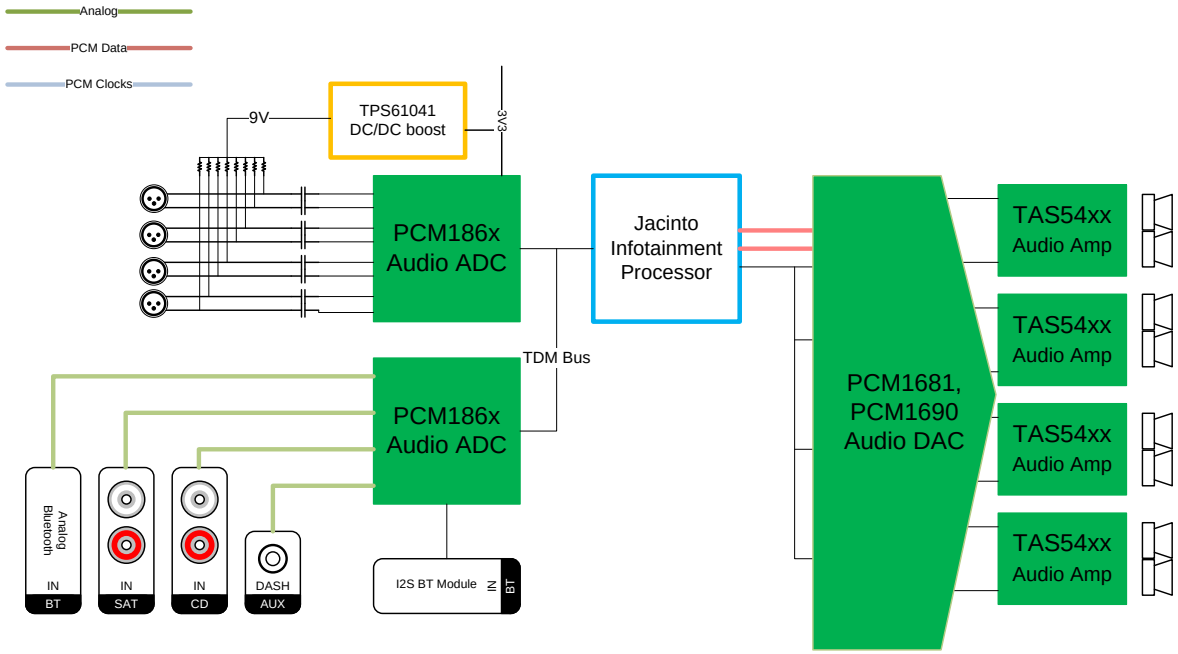
The PCM186x's highly flexible audio front end supports input levels from small-mV microphone inputs to 2.1V_{RMS} line Inputs without external resistor dividers. The PCM186x family integrates many system-level functions that assist or replace some DSP functions.

The PCM186x also differentiates itself by integrating an on-chip Phase Locked Loop (PLL) that can generate real audio-rate clocks from any clock source between 1MHz and 50MHz. It can have their PLL programmed to generate audio clocks based on any incoming clock rate. For example, a 12MHz clock in the system can be used to generate clocks for a 44.1kHz system.

All these features are available using a single 3.3V power supply.

Key Features

- Up to 110dB Dynamic Range
- Integrated PLL
- Universal Analog Mic Input, 2.1V_{RMS} Full Scale; No need for external resistor dividers
- Universal Front End: 2 V_{RMS} MUX, MIX, PGA, Aux ADC and up to 4 independent mono ADCs; No need for external programmable-gain amplifier



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265