

# TI AM275x Audio DSP: Reshape In-Vehicle Audio Technology



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In a time when smart vehicles are rapidly evolving, the in-vehicle audio experience has become a critical dimension in measuring vehicle quality. Digital Signal Processor (DSP), as the core of modern audio technology, plays a crucial role in the wave of intelligence.

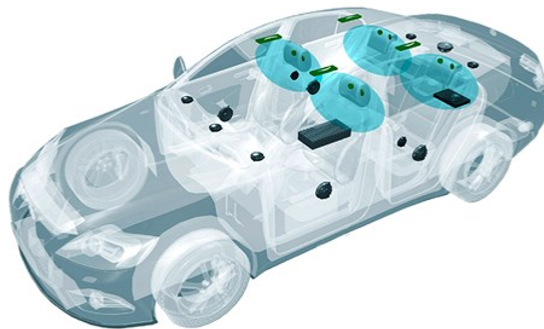


AM275x audio DSP launched from Texas Instruments (TI), boasting its innovative hardware design, powerful computing power and flexibility, and its high-performance architecture as well as highly integrated design, is redefining the listening experience in the vehicle and offering the fully upgraded acoustic solutions for vehicles ranging from entry-level to luxury models. Here we will introduce it from the following aspects: hardware innovation, feature innovation, system integration, safety and reliability, as well as simultaneous improvement of energy efficiency and sound quality:

**Immersive 3D sound**  
Dolby DCX

**Quieter Cabins**  
Road Noise Cancellation

**Boost listening experience**  
32 plus speakers tuning



**Personalized Sound**  
Engine Sound Synthesis, Chime

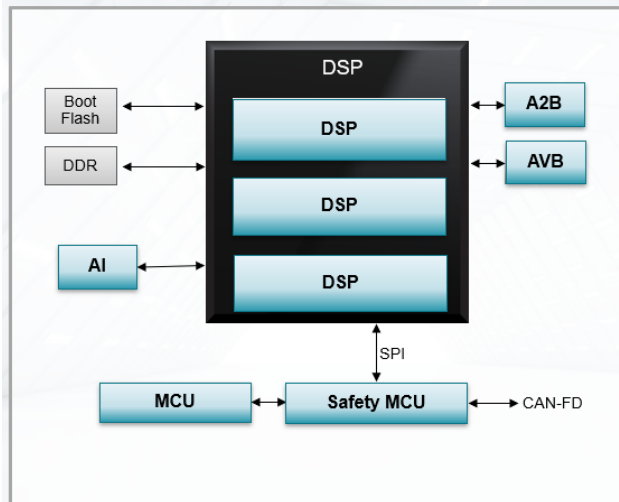
**Secured high quality Audio**  
Ethernet AVB, Security

**Safer roads**  
AVAS / Pedestrian alert

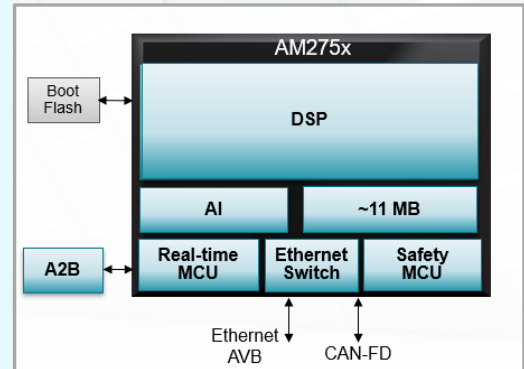
**Hardware innovation: A single chip solution to meet your system requirement:** AM275x rebuilds the hardware of DSP with a new architecture compared to traditional amplifier systems: Not only does a single chip

meet the performance previously required multiple DSPs, saving external DDR and MCU, but it also meets the needs of the future: support AI audio, next-generation Ethernet-based Audio, functional safety and security.

### 传统Audio DSP架构



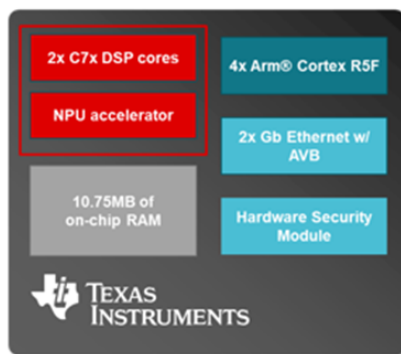
### 革新音频DSP系统



**Feature innovation: support Dolby and AVB from immersive sound fields to AI:** rebuild spatial audio

- support multi-channel 3D stereo fields and optimize source positioning with algorithms so as to create a theater-class surround experience for passengers. Active noise reduction and sound synthesis - By integrating the real-time sensor data, it dynamically cancels road noise and engine vibration interference and simulate engine sound to suit the needs of electric vehicles and conventional fuel vehicles. Edge AI processing - Integrate Neural Processing Unit (NPU) to support the adaptation of AI voice enhancement and personalized sound.

### AM275-Q1



### 7.1.4 Dolby DCX decoding and rendering

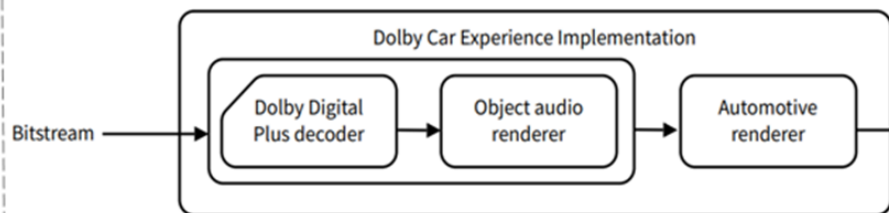
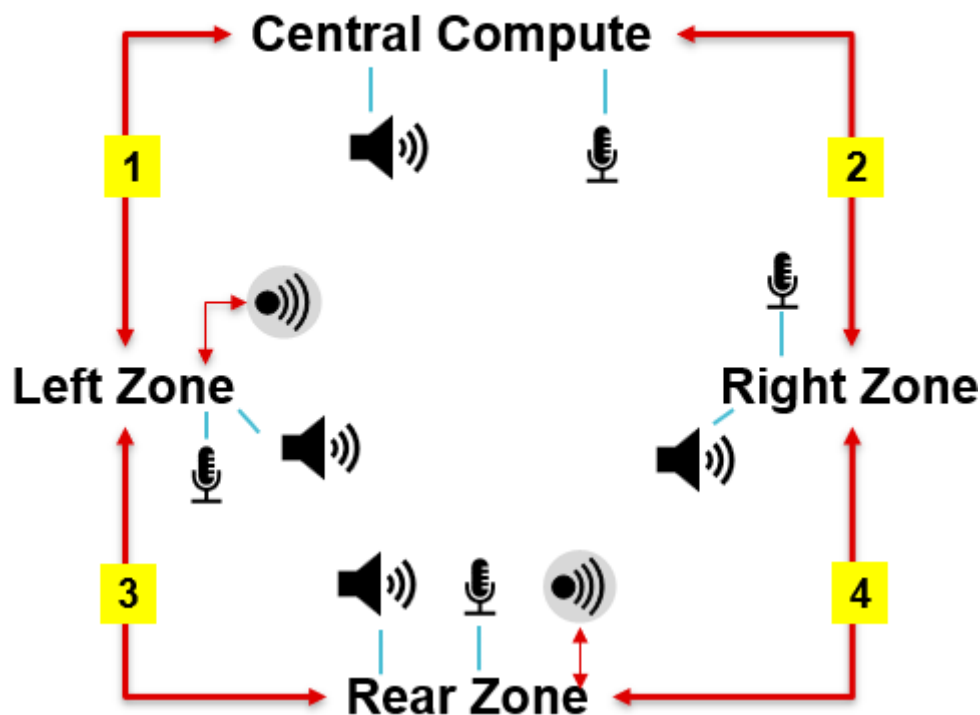


Figure 1. Ring-based Ethernet Audio – AM275x AVB

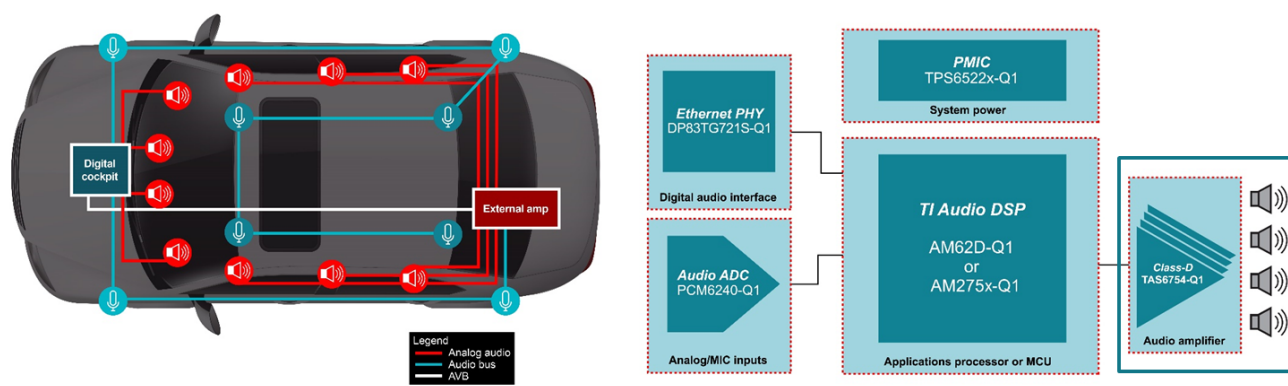
## Ether-ring w/ eAVB



**System integration: simplified design and strong scalability:** AM275x uses a highly integrated SoC design that integrates the DSP, MCU core, Ethernet switch, memory and hardware security modules into a single chip solution. It reduces the number of components by 30% compared to traditional solution. In addition, TI offers a platform strategy in which you can flexibly choose AM275x (Without DDR) in multiple versions depending on different needs for vehicle models, meanwhile, software is compatible with hardware, thus it can greatly shorten development cycles. TI also offers examples in which a single chip is integrated with 32-Ch Tuning, RNC, AVAS, Chime and AVB to start your system design quickly.

**Safety and reliability: safeguard intelligent audio systems:** Addressing the safety needs of the in-vehicle environment, it is used in safety scenarios such as seat belt reminder, deeply integrating audio function with vehicle safety. AM275x has a built-in Hardware Security Module (HSM) that supports secure boot, multiple cryptographic algorithms, and isolated storage technologies to meet ASIL-D functional safety ratings and AEC-Q100 automotive certification.

**Simultaneous improvement of energy efficiency and sound quality:** Coupled with TI's TAS6754-Q1 Class-D amplifier, "Single Inductor Modulation" technology is adopted to improve energy efficiency while reducing the number of inductors, system heating and noise interference. This combination provides the technical support for longer range in EVs, based on high fidelity sound quality.



AM275x family not only drives the leap of in-vehicle audio from "function" to "scene", but also lays a foundation for automakers to explore more possibilities in smart cabins through open-minded algorithm ecosystems and edge AI capabilities. As cars become increasingly well positioned as the "third living place", TI's audio DSP technology may lead a cross-category acoustic revolution. With TI's systematic solution, we can quickly innovate your audio system design.

### AM2754-Q1

- TI.com: [ti.com/AM2754-Q1](https://www.ti.com/AM2754-Q1)
- EVM: [AUDIO-AM275-EVM](#)

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