AMD AUTOMOTIVE ANNOUNCEMENTS CES 2024

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CONTEXT

At CES 2024, AMD made a significant announcement, unveiling its expanded venture into the automotive technology sector by introducing two products: the Versal™ AI Edge XA adaptive SoC and the Ryzen Embedded V2000A Series processor.

AMD's new offerings underscore the company's commitment to participating in the automotive industry, especially in segments like infotainment, advanced driver safety, and autonomous driving.

The Versal AI Edge XA SoCs, equipped with advanced AI Engines, are tailored for a range of next-generation automotive systems. At the same time, the Ryzen Embedded V2000A processors are set to offer significant capabilities for automotive digital cockpits with their high-performance capabilities.

The announcements reflect AMD's growing focus on the automotive sector, leveraging its expertise in AI and computing to address the evolving needs of this dynamic industry.

VERSAL AI EDGE XA

The Versal AI Edge XA is AMD's line of adaptive system-on-chips (SoCs, designed explicitly for advanced automotive systems.

Key characteristics of the Versal AI Edge XA include:

1. **Advanced AI Engine**: The SoCs are equipped with an advanced AI Engine, optimizing them for next-generation automotive applications. This includes forward cameras, in-cabin monitoring, LiDAR, 4D radar, surround-view systems, automated parking, and autonomous driving functionalities.

2. **Auto-Qualified Device**: These SoCs are noteworthy as they are the first AMD devices with a 7nm process to be auto-qualified. This qualification underlines

their suitability and reliability for automotive applications where safety and robustness are critical.

3. **Enhanced Safety and Security**: Given the stringent safety requirements in the automotive sector, the Versal AI Edge XA SoCs are designed with hardened IP and added security features, ensuring they meet the high safety standards necessary for automotive use.

4. **AI Compute, Vision, and Signal Processing Capabilities**: The AI Engines in these SoCs can perform AI inference on large volumes of data. They can be used in edge sensors, such as LiDAR, radar, and cameras, or in centralized domain controllers, showcasing their versatility.

5. **Handling Different AI Models**: The AI Engines are adept at managing various AI models, including those for classification and feature tracking, making them suitable for a wide range of automotive AI applications.

6. **Scalability and Design Portability**: The product portfolio of these SoCs ranges significantly, from 20k LUTs to 521k LUTs and from 5 TOPs to 171 TOPs. This scalability allows designers to easily port their designs across applications using the same tools, ecosystem, and safety certifications.

7. **Focus on High-Performing AI Applications**: The Versal AI Edge XA SoCs are tailored to accelerate high-performance AI compute applications, providing an optimal balance of performance, safety, and security for advanced automotive designs.

8. **Release and Future Plans**: AMD plans to release the first devices in this line early in 2024, with further releases scheduled later in the year, indicating a commitment to continuous development and innovation in this area.

RYZEN EMBEDDED V2000A SERIES PROCESSOR

AMD's Ryzen Embedded V2000A Series processor is geared towards powering next-generation digital cockpits in vehicles.

Key features and benefits of the Ryzen Embedded V2000A Series include:

1. **Targeted for Automotive Digital Cockpits**: These processors are specifically designed for automotive digital cockpit systems, including infotainment consoles, digital clusters, and passenger displays, enhancing the overall in-vehicle experience.

2. **High-Performance Computing**: Built on AMD's innovative 7nm process technology, the Ryzen Embedded V2000A Series processors offer exceptional performance and are capable of handling demanding multitasking requirements in modern vehicles.

3. **Advanced Graphics Capabilities**: Integrating 'Zen 2' cores and high-performance AMD Radeon Vega 7 graphics, these processors deliver high-definition graphics, crucial for advanced infotainment and interactive display applications within vehicles.

4. **Enhanced Security Features**: Recognizing the importance of security in automotive applications, these processors have enhanced security features, ensuring the protection of sensitive data and systems within the vehicle.

5. **Support for Automotive Software**: The processors are compatible with Automotive Grade Linux and Android Automotive, providing flexibility and ease for automotive manufacturers in software development and integration.

6. **Auto-Qualified Processor Family**: As the first x86 auto-qualified processor family, they offer a unique blend of performance and reliability tailored to meet the rigorous standards of the automotive industry.

7. **PC-Like In-Vehicle Experience**: AMD aims to replicate the PC-like experience in vehicles, allowing consumers to enjoy similar entertainment and connectivity features as found in home environments.

8. **Applications in Next-Generation Vehicles**: The Ryzen Embedded V2000A Series is positioned to significantly enhance the capabilities of next-generation digital cockpit solutions, focusing on software-defined vehicles in 2024 and beyond.

9. **Collaboration with Industry Partners**: AMD's collaboration with companies like ECARX highlights the processor's suitability for advanced automotive solutions that require both compute power and visual graphic rendering capabilities.

ANALYSIS

The introduction of the Versal AI Edge XA adaptive SoCs and the Ryzen Embedded V2000A Series processors are a nice entry by AMD into the automotive ADAS and infotainment markets.

The Versal AI Edge XA is capable of handling complex AI models and providing scalable performance, are well-positioned to address the increasing demand for intelligent and efficient processing in vehicles.

The Ryzen Embedded V2000A Series processors, on the other hand, may be a game-changer for the automotive digital cockpit space. Offering a PC-like experiences with high-definition graphics and enhanced security features, these processors leverage AMD’s long legacy in consumer-first experiences.

However, there are challenges in industry adoption. AMD's ability to convince automakers to adopt its SoCs and FPGAs will be critical to realizing its vision.

Automotive electronics is a fiercely competitive market with a growing cadre of technology companies staking territory. Companies such as Qualcomm and NVIDIA are taking a full-stack approach to solving the needs of the SDV space, primarily based on Arm-derived processors, while AMD is pursuing a more constrained approach focused on enabling specific silicon solutions.

AMD's main competitor, Intel, also has eyes on this market, and this week, they also introduced new processor solutions targeting the same markets. The challenge for both AMD and Intel will lay in the ability of each to enable an ecosystem where none really exists today. But both companies have entered new markets before, so are familiar with the process.

Overall, AMD's showcase at CES 2024 and its latest offerings highlight the company's agility in adapting to the evolving automotive sector, addressing key areas such as AI, safety, and user experience. These developments indicate a healthy growth trajectory for AMD in the automotive space, aligning with the industry's shift towards more software-defined, AI-enabled vehicles.

For automotive manufacturers and technology providers, AMD's advancements present new opportunities for innovation and collaboration to redefine the automotive experience.

Research Note