# ECARX Builds Next-Gen Immersive Digital Cockpit Platform with AMD Processors

AMD Ryzen™ Embedded V2000 Series Processors and AMD Radeon™ RX 6000 Series GPUs Deliver Advanced Visual Graphic Rendering Capabilities

## PARTNER



### INDUSTRY
Automotive

### CHALLENGES
ECARX was looking to create an immersive automotive digital cockpit computing platform with advanced computing power and graphic processing capacity.

### SOLUTION
AMD Ryzen™ Embedded V2000 Series Processors and AMD Radeon™ RX 6000 Series GPUs deliver advanced computing power and stunning visual graphic rendering capabilities.

### RESULTS
Powered by AMD platforms, ECARX Makalu Computing Platform achieves expectations perfectly.

### AMD TECHNOLOGY AT A GLANCE
Ryzen™ Embedded V2000 Series Processors and AMD Radeon™ RX 6000 Series GPUs

Today's advances in technology favor the growth of electrification, intelligence, and networking, transforming vehicles into smart terminals integrated with information, communication, and transportation.

The digital cockpit is one of the most important fields in this revolution that has stringent requirements for hardware, software, and interactive experiences. The continuous improvement of the intelligent car is also driving the evolution of digital cockpits, making various information, networking, and entertainment functions more complicated.

ECARX has a wealth of experience in the design and mass production of automotive digital cockpits. Its platforms have been installed on more than 6 million vehicles worldwide. In response to the ever-increasing demands for richer and more in-cabin immersive entertainment, ECARX has announced the ECARX Makalu Computing Platform for the global market.

The ECARX Makalu Computing Platform offers the powerful performance of 394K DMIPS and graphic rendering capability at 10.1T FLOPS, supporting up to 32 GB stand-alone memory and a ground-breaking 8 GB of VRAM. The platform supports in-vehicle immersive AAA games, full-scene 3D HMI, 8K/60 Hz immersive large-screen display, up to 6 x 4K high-definition screen display and 7.x.4 panoramic spatial sound.

## CHALLENGE

"Automakers are now seeking to bring immersive experiences and innovative intelligent functionality to next-generation EVs," said Ziyu Shen, co-founder, chairman and CEO of ECARX. "The in-cabin interaction scenarios and effects are becoming more complex while the requirements for concurrent computing are constantly growing, all of which rely on more powerful computing and graphics-rendering capabilities."

For digital cockpits, all features, including screen display, voice recognition, gesture recognition, and more-interactive forms, can only be realized with robust concurrent computing. Computing power is also closely related to the future extension of diverse functions, coping with the rapid evolution of smart cockpits.

Graphics-rendering capabilities are also critical to achieving an immersive digital cockpit experience, as digital cockpits feature a wide range of functions and interactive scenarios that require real-time rendering of high-quality graphical interfaces and multimedia content. A powerful GPU can help provide excellent image processing and support the development and implementation of more complex functions, providing users with an exceptional interactive experience.

ECARX's goal was to create an immersive digital cockpit computing

platform with breakthrough performance for the automotive market that truly enhances consumers' in-vehicle experience with powerful performance, computing power, and graphics-processing capabilities.

## SOLUTION

As intelligent configurations of vehicle cockpits keep upgrading, corresponding products have been deployed in vehicles, including multi-function seats, UHD central control screens, rear entertainment screens, panoramic sound, AR/VR glasses, game controllers/platforms, etc. Building an immersive cockpit entertainment experience has become the next battleground for automotive companies. The ever-growing demands for "the third space," from the in-cabin interaction of human-machine interfaces to large-scale applications (such as games, etc.), is driving higher requirements for computing power and video graphics rendering capabilities of cockpit processors. With a mass production experience of more than 6 million digital cockpit products and a forward-looking judgment on the industry, ECARX has adopted AMD Ryzen™ Embedded V2000 processors and AMD Radeon™ RX 6000 Series GPUs, providing powerful computing for its ECARX Makalu Computing Platform.

The AMD Ryzen Embedded V2000 Series processors are the second generation designed for automotive in-vehicle infotainment and instrumentation applications, plus additional applications such as industrial edge, thin client, and miniPC systems. Each processor can power up to four independent displays simultaneously in 4K resolution as it is equipped with up to eight CPU cores and seven GPU compute units. A single AMD Ryzen Embedded V2000 Series processor provides up to 2X[1] the multi-threaded performance-per-watt, up to 30 percent[2] better single-thread CPU performance, and up to 40 percent[3] better graphics performance over the previous generation.

AMD Radeon RX 6000 Series GPUs are built on the breakthrough AMD RDNA™ 2 graphics architecture, covering the graphics architecture for next-generation automotive infotainment systems. The AMD RDNA 2 architecture offers up to 2X higher performance[4] and up to 50 percent more performance-per-watt[5] in select titles, compared to the previous-generation AMD RDNA architecture.

## RESULT

Benefiting from the company's rich experience and insights based on a mass production of over 6 million digital cockpit products, ECARX integrates a variety of scalability and safety designs into the hardware by combining the powerful performance of AMD with the needs of in-vehicle usage scenarios. The designs span from a safety architecture that meets vehicle safety requirements (including functional safety), to adaptation and expansion of vehicle interfaces (such as cameras, networks, and audio). They also include purpose-built customized power management, power consumption management, heat dissipation optimization, fault monitoring, temperature control systems, and more.

In terms of software, ECARX plans to create an open and immersive automotive-grade digital cockpit computing platform that can meet the needs of different models and brands.

"ECARX fully uses the powerful computing and visual graphics-rendering performance of AMD processors with a purpose-built virtualization program and other system software," Ziyu said. "This software enables the outstanding performance of AMD processors to be flexibly allocated to various demand sides and functional domains while also supporting the smooth operation of operating systems, such as Linux or Android Automotive."

The first model equipped with the ECARX Makalu Computing Platform is expected to be mass-produced in the first half of 2024. Several models equipped with the ECARX Makalu Computing Platform will be launched in succession in the same year.

### WANT TO LEARN MORE?
**About AMD Ryzen™ Embedded V2000 Series Processors**

**About AMD Radeon™ RX 6000 Graphics Cards**

**About ECARX**

(DX12 Ultra), Division 2 (DX12, Ultra), F1 2020 (DX12, Ultra), Far Cry 5 (DX11, Ultra), Gears of War 5 (DX12, Ultra), Hitman 2 (DX12, Ultra), Horizon Zero Dawn (DX12, Ultra), Metro Exodus (DX12, Ultra), Resident Evil 3 (DX12, Ultra),  Shadow of the Tomb Raider (DX12, Highest), Strange Brigade (DX12, Ultra), Total War Three Kingdoms (DX11, Ultra), Witcher 3 (DX11, Ultra no HairWorks) at 4K. System comprised of a Radeon RX 6800 XT GPU with AMD Radeon Graphics driver 27.20.12031.1000 and an Radeon RX 5700 XT GPU with AMD Radeon Graphics driver 26.20.13001.9005, Intel Core i9-9900K (3600 MHz 8C/16T), 32 GB at 2133 MHz, ROG MAXIMUS XI HERO (WI-FI) motherboard. Laptop manufacturers may vary configurations, yielding different results. Performance may vary. RX-549.

Performance and cost-savings claims are provided by ECARX and have not been independently verified by AMD. Performance and cost benefits are impacted by a variety of variables. Results herein are specific to ECARX and may not be typical GD-181.

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