



## DFI Empowers German Client in Creating an Autonomous Car.

### Key Info

- The performance of CMS103, along with its diverse communication interfaces, has been proven to be well-suited for the requirements of Autonomous Vehicles.
- The German client has achieved autonomous functionality using CMS103 in a machine-vision processing device.
- DFI can support you in building smarter, multi-functional Automotive Vehicles.

**Industry:** Autonomous car

**Application:** Machine vision  
computer

**Solution:** CMS103  
Mini-ITX Industrial  
MotherBoard

Thanks to the significant development of machine vision, autonomous vehicles have evolved from famous concepts into realistic technical products in recent years. In crafting the finest machine vision functionality, we need to integrate various devices, including sensors and camera modules. Among these, a high-performance computer plays a crucial role for autonomous vehicles to identify road conditions effectively.

DFI, a global leader in the industrial PC industry, has supplied the mini-ITX industrial motherboard CMS103 and leveraged its extensive experience in the vehicle industry to assist a German client focused on autonomous vehicles. This collaboration aims to upgrade their machine vision computer, paving the way for the creation of autonomous cars.

## The Six Key Features of machine vision computer used in Autonomous Cars

As mentioned, the machine vision computer plays a crucial role in achieving self-driving capabilities and calculating correct routes in real-time. Leveraging their professional experience, the client has identified certain essential functions that the computer must have, listed below.

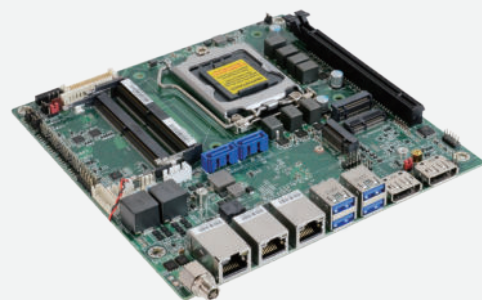
1. High performance for calculating routes using data from cameras.
2. Well-capable of heat dissipation.
3. Built with at least 1 USB 3.0 and Ethernet for connecting peripheral sensors.
4. Extremely ruggedized design, including anti-vibration features.
5. Lighter weight, as much as possible.
6. The graphics card must be implemented to be compatible with the camera.

Before collaborating with DFI, the client utilized a Barebone computer as the machine vision computing unit. However, the previous computing solution lacked the necessary computing power, leading to operational failures.

The CMS103 is equipped with an LGA1200 socket for installing 10<sup>th</sup> generation Intel Core i-series processors, along with components, including two SO-DIMM DRAM slots supporting up to 64GB. This configuration ensures ample computing power for effectively implementing route calculations in autonomous vehicles.

Furthermore, it also features rich I/O ports, including one 2.5GB/s Ethernet port and two 1GB/s Ethernet ports, enabling machine vision devices to transmit data to the machine vision computer stably and immediately. Additionally, it provides expansion slots like PCIe x16 for adding a graphics card. The CMS103's ruggedized features, including a wide-temperature and wide-voltage range spanning from 9 to 36V, enable it to meet the client's requirement for maintaining system stability in various environments.

CMS103





The German client rebuilt their machine vision computer using the CMS103, featuring Intel Core i9-10900KF processors as the core, accompanied by an Nvidia graphics card RTX 3050 and 64GB DDR4 supporting speeds up to 3200 MT/s. Through testing, the newer configuration demonstrated significant performance improvements compared to the previous one. For instance, the instruction per clock (IPC) of the new computer ranges from 1.38 to 1.49, surpassing the previous range of 1.28 to 1.36. Most importantly, even though the new computer is lighter than the old one, its reliability and safety are still superior when dealing with the challenges posed by machine force.

## DFI's Next Goal: Maximizing Comprehensive Services with Diverse, High-Quality Products, and Exceptional Customization Skills

Through this case, the CMS103 has demonstrated its remarkable capabilities, including robust computing power, great connectivity with various peripheral devices, and high reliability and stability. These attributes empower it to operate effectively in challenging environments. DFI is well-prepared to address not only the growing trend in the automotive industry for smarter and more versatile cars but also the challenges for vendors in creating products that can meet the long-term demands for high safety and stability from manufacturers.

For over 40 years, DFI has dedicated itself to crafting high-performance and quality industrial PCs. Our extensive portfolio includes versatile Industrial Motherboards (IMBs), industrial Box PCs, and Panel PCs.

Additionally, we offer comprehensive products specifically tailored for AI applications, such as machine vision. With a strong focus on customization, we cater to the unique needs of our clients.

On the manufacturing front, DFI has upgraded a factory in Taoyuan to a smart factory, with the aim of enhancing both quality and efficiency. Especially in our commitment to maintaining quality, our dedicated efforts have resulted in a Defective Parts Per Million (DPPM) of products at a level lower than 1,000.

DFI has been developing solutions, including the new industrial motherboards RPS101/103 and ADS101/103, both featuring 12<sup>th</sup>/13<sup>th</sup> Intel Core i processors. Moving forward, we will continue to enhance and strengthen our ecosystem, ensuring that we can provide clients with services to the fullest extent possible.

# DFI

Founded in 1981, DFI is a global leading provider of high-performance computing technology across multiple embedded industries. With its innovative design and premium quality management system, DFI's industrial-grade solutions enable customers to optimize their equipment and ensure high reliability, long-term life cycle, and 24/7 durability in a breadth of markets including factory automation, medical, gaming, transportation, smart energy, defense, and intelligent retail.

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