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*Original Paper*

# Application of Microcontroller in Automobile Engine Speed Measurement System

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***Abstract***

*Since the reform and opening up, China has always upheld the development concept of science and technology, and under the development trend of technology globalization, a large number of foreign automobile engine technology has been gradually introduced into the production and development of China's automobile industry. In this paper, the author mainly discusses the application of microcontroller and microcontroller in the automobile engine speed measurement system, and will also explain the microcontroller from the perspective of embedded system.*

***Keywords***

*automotive engine speed measurement system, embedded system, microcontroller*

## 1. Introduction

With the progress of scientific development, microcontroller has been used not only in computers and various communication devices, but also in the speed measurement system of automobile engines. From a macro point of view, the tachometer engine is not only a miniature engine to measure the speed, but also an important local component in the production of automobiles. If we want to promote our country's automotive industry to move forward, we must start from the two aspects of cost reduction and performance improvement, using the characteristics of low price, light weight and small size of the microcontroller, and combined with embedded systems and other operations to improve the car's power system, so as to achieve the purpose of science and technology to promote the country.

## 2. Overview of Microcontroller

A microcontroller is not a chip designed to complete a certain instruction, but a microcomputer that reduces a computer system into a chip, so it is also called a single microcontroller. In today's

technology, the best way to understand the structure and principles of computers is to learn how to use a microcontroller. From a practical point of view, microcontrollers are divided into three main categories, namely general-purpose, bus and control. The general-purpose type is divided according to the scope of application, this type of microcontroller is not specifically designed for a particular purpose; bus type is according to whether the microcontroller is used for parallel bus, bus type microcontrollers are generally set up with a control bus and data bus, so these pins can generally be connected through the serial port; control type microcontroller is divided according to the application area, in general, this type of Generally speaking, this type of microcontroller has stronger computing power and wider addressing range. Microcontrollers are widely used in the automotive industry, such as engine controller, brake system and abs anti-lock system.

## 3. The Application of Embedded Systems

In simple terms, embedded system is the system application hardware and the system software into one, with a high degree of automation and fast response time and so on. In my country embedded system is generally defined as: computer technology-based, application software-centered, by changing the system's function, cost and reliability of computer-specific systems, but from the essence of embedded systems, it should be a combination of hardware and software, not only to play a control and supervision of the auxiliary system, but also to cover a variety of mechanical operation of the subsidiary device. The microcontroller in the automobile engine speed system is the embedded system, and through the skillful use of modern technology, the microcontroller is embedded in the automobile engine speed system to realize the supervision and control of the automobile speed. The embedded system is very suitable for the control system of electromechanics because it has the characteristics of high specialization and effectiveness. In modern technology, in order to improve the reliability of the system, the software of the embedded system is usually cured in the microcontroller, rather than in the carrier such as disk. In the car engine speed system embedded in the microcontroller, embedded processor is the core component of the whole embedded system, the operation of the effect depends on the performance of its good or bad. Due to the continuous leap of the times, the old low-grade CPU has long disappeared, but in order to meet the market demand in different fields, low-end processors still exist, which led to the inclusion of embedded processors also entered the market, prompting the emergence of embedded processor products, which in turn led to the embedded system continues to mature, was gradually applied to the field of automotive engine speed measurement.

## 4. Application of Microcontroller in Automobile Engine Speed Measurement System

### *4.1 Cost Reduction*

As the world of science and technology continues to move forward, China's microcontroller manufacturers must adopt appropriate policies to meet global technology standards, so in the design of new products not only to join some new hardware to meet the standard features, but also should

provide the underlying drive hard disk used by MCAL. Embedded in the automotive engine speed system microcontroller can not only reduce costs through standardization, but also by reducing the cost of hardware to meet modern market requirements, the main method is to develop new software to achieve the original functions and instructions that must be achieved through hardware, if you can use this method of real-time monitoring of the engine speed system, this solution not only saves expensive hardware system It also avoids the speed measurement errors caused by the aging of the hardware itself. Due to the increasing integration of semiconductors, the size of ECU hardware has been reduced, which provides the reliability of new installation modes, such as installing the ECU directly into the engine transmission or using the integration principle to install the ECU directly into the turbocharger unit, which not only fundamentally saves hardware costs, but also changes the supply of automotive parts in the market, optimizing the supply chain. This method not only fundamentally saves hardware cost, but also changes the supply method of auto parts in the market and optimizes the supply link.

*4.2 Increase the Performance of Automotive Engine Speed Measurement Systems*

The reduction of gasoline consumption and exhaust emissions has become a major global issue due to the reduction of fossil fuels and the deterioration of air quality. If we want to fundamentally solve these two problems, we need a powerful microcontroller in the ECU to complete the algorithm of various software embedded in the system, and to control and supervise the hardware. In order to adapt to the changes in the automotive market, the standardized hardware will be produced to adapt to the development of standard low-cost cars to withstand the pressure of product changes due to cost reduction. In my opinion, the future of the automotive industry will be the mainstream trend of high-grade engine systems, so the performance of the microcontroller in the car engine speed system is particularly important, its computing speed is expected to increase to about 520MIPS, and the size of the internal storage will also reach 5MB, but contemporary science and technology is difficult to complete only rely on a microcontroller to complete such a high computing speed and storage capacity Therefore, in the future ECU, more microcontrollers will be used to average the heat brought by the car engine during operation and the tasks it performs.

*4.3 Ensure System Safety and Extend System Life*

The microcontroller, as a microcomputer, replaces various hardware facilities with software, which will not only reduce the number of relay replacements, but also reduce the number of failures and extend the service life of the motor. Since the new motor uses microcontroller instead of relay, it fundamentally reduces the input and output circuits, which in turn reduces a series of problems due to line contact faults and makes the speed measurement system of automobile motor more reliable and ensures the safety of the system.

## 5. Conclusion

In summary, this paper mainly analyzes the main application of embedded system and microcontroller to automobile engine speed measurement system, and combines the changes of our contemporary

automobile market to improve the practicality of the automobile accordingly, in the author's opinion, in order to meet the market demand, embedded system will be widely used in the automobile industry.

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