

Application of single chip microcomputer in electronic technology

Duan Weihua

Sichuan Vocational & Technical College Chengdu, Sichuan, China

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Abstract: The wide application of single chip microcomputer technology in the field of electronic technology can improve the reliability and stability of electronic technology. Single chip microcomputer technology can promote the innovation and development of various industries. Analyzing the specific application of single chip microcomputer technology in electronic technology and understanding the key technical means can lay a foundation for the orderly development of various work. Based on this, this paper mainly analyzes the structural characteristics and principle of single chip microcomputer, and focuses on the application of single chip microcomputer in electronic technology and technology development for reference.

1. Introduction

With the rapid development of China's economy, science and technology and other fields, the overall technical level of China's industry has been greatly improved, and the relevant electronic technology is also undergoing continuous reform and innovation. In this process, the application of single chip microcomputer in electronic technology has become more diversified and mature, and has become an important direction of the development of electronic technology. Therefore, understanding the composition and operation principle of single chip microcomputer, fully understanding the advantages of single chip microcomputer in the field of electronic technology, and mastering the practical application cases of single chip microcomputer in the development of electronic technology have become the topics that staff in relevant fields need to pay attention to.

2. Principle of single chip microcomputer

In essence, single chip microcomputer is a programmable integrated circuit, and its operation principle is a process in which each component completes its own work. First, the tasks to be realized are written into instructions. Each component of the single chip microcomputer must complete its basic tasks. This set is called the instruction system. Under normal circumstances, a certain part of the ultimate task that the single chip microcomputer needs to finally realize cannot be completed alone^[1]. It can be divided into multiple single instructions and assigned to each component to complete it jointly. The task realized by the whole single chip microcomputer is called a program. Because MCU has different types, task implementation and instruction system are also different. The program is stored in the memory first. When the single chip microcomputer executes a command, the address of the instruction storage unit will be transmitted to the program counter in order and stored in the memory. Then each component will execute these instructions and finally complete the corresponding task(Fig. 1).

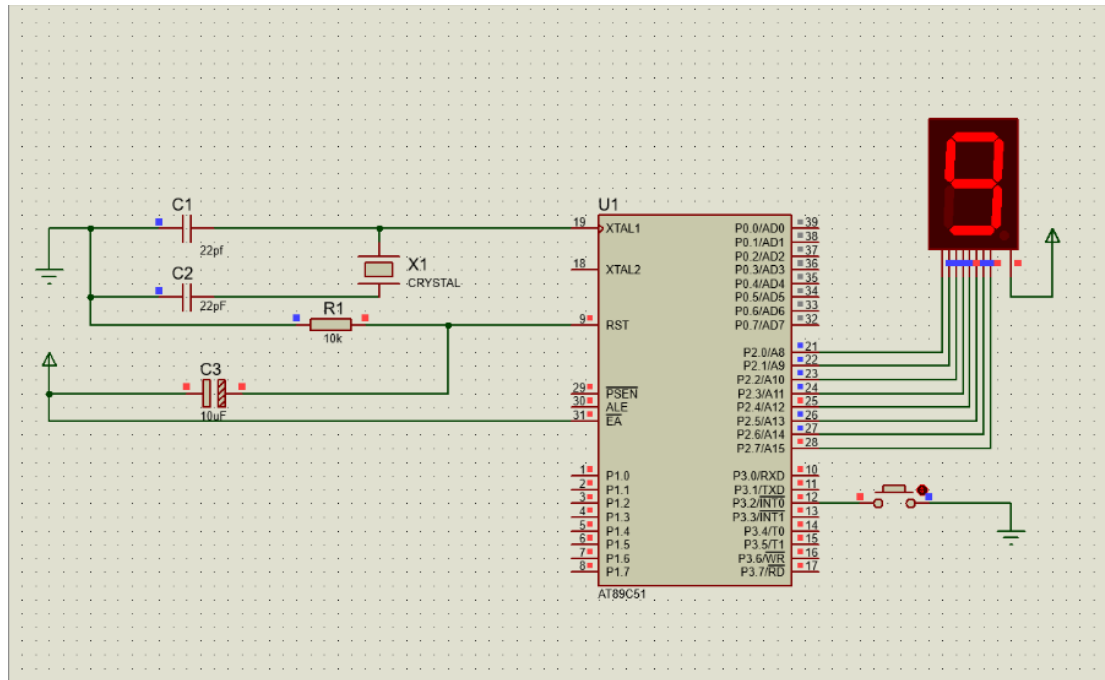


Fig. 1 Principle of single chip microcomputer

3. Basic composition of single chip microcomputer

There are three main components of single chip microcomputer, and each component has different functional characteristics. First, memory, which is the location for storing instructions, can be divided according to the storage content and address. In essence, there is a great difference between the storage content and the storage address^[2]. The stored contents are those instructions that have been stored in memory, in which binary information is expressed by hexadecimal numbers. When the storage unit needs to store each piece of information, it is stored in a corresponding address, and all addresses are unique. Second, the arithmetic unit. Among the various parts of the single chip microcomputer, the arithmetic unit is the busiest part. The contents of the arithmetic unit include: arithmetic unit, register and accumulator, and its core position is the arithmetic unit. The whole operation process is: the accumulator saves the result after cache operation, and the register performs multiplication and division. Third, the controller, which is equivalent to the existence of single chip microcomputer brain, has very strong control and coordination power, and the work of each link is regulated by the regulator(Fig. 2).

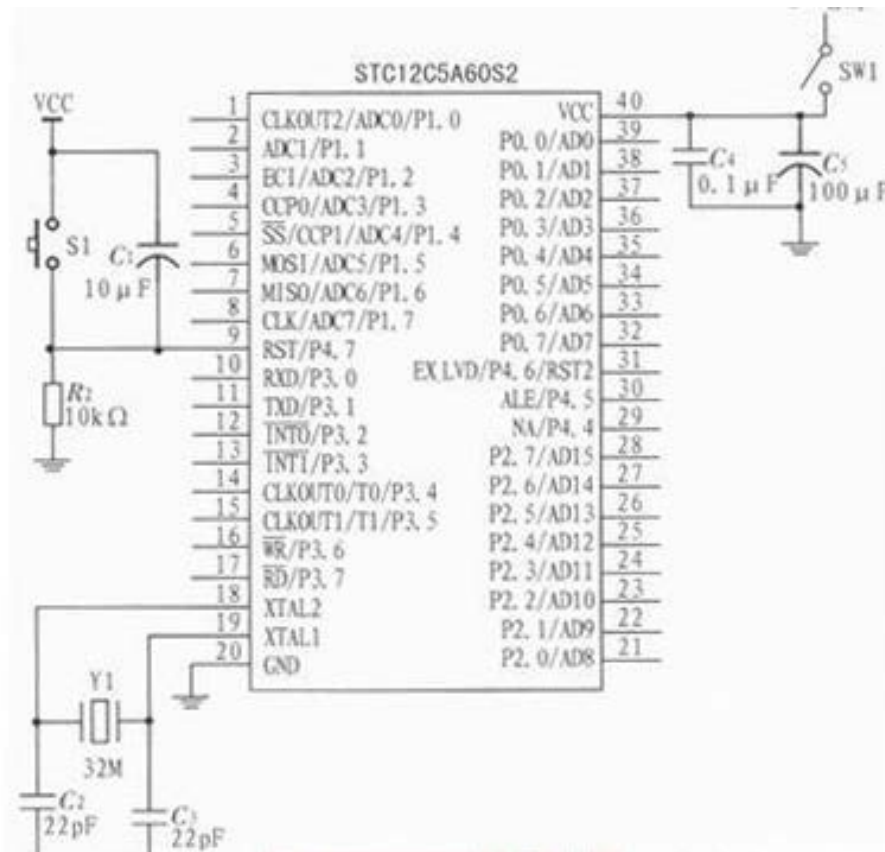


Fig. 2 Basic composition of single chip microcomputer

4. Characteristics of single chip microcomputer

In the current process of computer development, single chip microcomputer is an important part. With the continuous growth of computer computing, single chip microcomputer is in high-efficiency innovation, and single chip microcomputer products will also have different uses and models. Here, we will take STC12C5A60S2 / AD / PWM series as an example to illustrate the characteristics of single chip microcomputer. First, it is easy to use. We all know that the overall volume of single chip microcomputer is small, and the system structure is relatively simple. The overall style will show a modular state^[3]; Second, the environmental requirements are low. Single chip microcomputer can adapt to various environments and can be applied in different environments; Third, the control power is strong. Single chip microcomputer has strong scientific and technological power and can integrate many functions. Its control function is very strong; Fourth, the function consumption is low. The voltage required by the single chip microcomputer in the operation process is relatively low. The working voltage of 5V single chip microcomputer is 5.5 ~ 3.3V, and the working voltage of 3V single chip microcomputer is 3.6 ~ 2.2V. The overall function consumption is very low; Fifth, the speed is fast, the processing function of single chip microcomputer is also very powerful, and the speed of processing various data and information is very fast; Sixth, the reliability is high. The single chip microcomputer can work for a long time to improve the operation ability of the overall system.

5. Application advantages of single chip microcomputer in electronic technology

5.1 Single chip microcomputer increases the stability of the system

The application of single chip microcomputer in the field of electronic technology can improve the stability of the system. In the process of long-term operation of the system, the change factors of input and output directly affect the stability of the system. In the process of system application, if its resolution and sensitivity decline, it will also directly affect the stability. Single chip microcomputer

can effectively improve the stability of the system^[4]. Using single chip microcomputer to modify the sensor equipment and change the nonlinear related system can fundamentally improve the stability of the system and then increase the working performance parameters.

5.2 Single chip microcomputer increases the anti-interference of the system

The application of single chip microcomputer in the field of electronic technology can effectively improve the anti-interference of the system itself. It is mainly manifested in two aspects. 1) Resist deterministic interference^[5]. The daily system will be affected by the external environment and the corresponding internal structure, resulting in some interference problems. The existing problems can be solved by single chip microcomputer.

5.3 Single chip microcomputer resistances to random interference

In daily production, the operating environment of the electronic system is more complex, and its signal to noise ratio will be affected to varying degrees with the random fluctuation problem. In order to effectively solve this problem and ensure the stability of model transmission, it can be optimized by single chip microcomputer, so as to reduce the system operation interference^[6].

5.4 Single chip microcomputer technology promotes the rapid development of related industries

After the application of single chip microcomputer technology, it can effectively improve its overall function and improve the stability of the system. In the process of the renewal and development of electronic technology, various equipment in the system show diversified development trends, different types of functions have certain differences, and various difficult problems will appear in the operation process^[7]. This problem can be effectively solved by single chip microcomputer technology. Single chip microcomputer technology can improve the operation efficiency of the system and enhance the operation quality of the system, The function of the system is optimized.

6. Application of single chip microcomputer in electronic technology

6.1 Application in household appliances

Household appliances play a great role in people's daily life. Almost all families have several household appliances, which can be said to be one of the essential items in our daily life. Single chip microcomputer plays two main roles in household appliances. On the one hand, using single chip microcomputer can well improve the production efficiency of household appliances, on the other hand, The use of single chip microcomputer can improve the function and performance of electrical appliances, so in household appliances, single chip microcomputer is used more frequently. Taking the most common washing machine in our life as an example, after using single chip microcomputer, we can freely choose the length of washing time to make life more comfortable; For example, if a single chip microcomputer is used in the refrigerator, a reasonable temperature can be selected to cool the food; When using the oven to cook food, a single chip microcomputer can make the oven automatically distinguish the freshness and range of food, and select the most suitable heating time to make the food taste better. From these examples, we can see that MCU is widely used in our daily life and has been gradually integrated into our life.

6.2 Application in industrial control

With the proposal of reform and opening up, all walks of life in China have ushered in a stage of rapid development. Economic development has driven the development of industry. In the process of industrial development, the application of single chip microcomputer is more and more widely. The field of industrial production is also one of the most important application fields of single chip microcomputer. In the field of industrial production, the most important factor for the normal operation of industrial control system and data acquisition system is usually used for integral tires. In the process of industrial production, the main function of single chip microcomputer is to

establish connection with computer and establish management model, and form an appropriate management system under the function of single chip microcomputer, so that enterprises can better carry out management work.

6.3 Application in intelligent instrument

With the continuous progress of social science and technology, many emerging technologies have been produced, and intelligent equipment is also one of them. Intelligence is a very popular content in the current market. In intelligent instruments, there is also the figure of single chip microcomputer. The rapid development of science and technology has led to the improvement of the application ability of single chip microcomputer, and the rapid development of single chip microcomputer has also changed the measurement accuracy of traditional measuring instruments to a certain extent, making the use of measuring instruments simpler. The intelligent instruments of single chip microcomputer are added, which has more powerful functions and makes the use of measuring instruments more extensive. It has had a great impact on the development of many industries in China.

6.4 Application in medical equipment

Medical treatment is also a major event for people's livelihood. People need to see a doctor in their daily life. With the improvement of people's quality of life, people's demand for medical care is becoming higher and higher. In the production process of medical devices, there are certain requirements for the disinfection level and testing methods of medical devices. However, some medical devices do not fully meet the requirements in the actual production process, which has a certain impact on the overall quality of medical devices. After using single chip microcomputer technology in medical equipment, the quality of medical equipment is greatly improved, many health problems caused by equipment are reduced, and the work efficiency of medical work is improved to a certain extent^[8]. When using the medical equipment with single chip microcomputer technology for diagnosis and treatment, it also improves the diagnosis and treatment rate, and brings great benefits to people's treatment, medical treatment and health care. With the gradual application of single chip microcomputer in medical equipment, medical equipment is slowly developing towards a more automatic and intelligent direction, which will bring better medical security to people in the future.

7. Development trend of single chip microcomputer

7.1 Miniaturization

In the current environment, most of the microcontrollers we often use are integrated on one chip, including ROM, ram, CPU, interrupt system and so on. The enhanced single chip microcomputer integrates PMW, WDT and a / D converter, and some single chips of single chip microcomputer integrate the LED driving circuit. Only in this way can the single chip microcomputer contain more unit circuits, so that the function of the single chip microcomputer can be enhanced. In addition, many single-chip computers have the problems of light weight and small volume. Therefore, in the future, single-chip computers will move towards miniaturization in addition to strong function and low power consumption.

7.2 CMOS

When the 8031 of MCS-51 series was just launched, its function loss reached more than 630MW. At present, the single chip microcomputer we use is basically about 100MW. But now people gradually reduce the function loss requirements of single chip microcomputer. According to the data given by the current single chip microcomputer manufacturers, most of them are CMOS. Although the function loss of metal oxide semiconductor process is low, it is difficult to improve the working efficiency of single chip microcomputer due to the influence of its own physical characteristics. CMOS can meet the requirements of high speed and low power consumption at the same time, so it can be used in relevant applications.

8. Conclusion

Single chip microcomputer is widely used in the field of electronic technology. It can not only significantly improve the service life of electronic equipment, but also has the advantages of excellent performance, excellent energy consumption ratio, good reliability and minimal space occupation. With the increasing R & D efforts in the field of electronic technology, the use of single chip microcomputer will be more popular and play a more and more important role.

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