

The Design of PLC Entrance Guard System Based on RFID Technology

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Abstract. With the rapid development of social economy and science and technology, rfid technology is more and more widely applied in various industries, especially the identification and security industries, entrance guard system as an important unit of the intelligent building is more and more get attention. This paper designed a kind of using RFID technology the high security of the intelligent entrance guard system, is through the RFID authentication fast confirm the identity of the intelligent entrance guard system. Based on the analysis of the elevator entrance guard system functional requirements, the PLC elevator entrance guard system based on RFID technology for the function modular design. The system has extensibility, for subsequent higher security requirements provide a solution that can be applied to the elevator internet of things development needs in the future.

Introduction

As to urbanization advancement speeding up unceasingly, more and more high-rise buildings have. Entrance guard control system is an important part of the construction of security system, for its internal work and life of people to create the necessary security, it will automatic identification technology and modern safety management method of the organic combination of the use of personnel in and out of the situation to carry on the statistics and control, at the same time, to enhance the security alarm function [1]. A set of complete function and equipment of entrance guard control system, not only as the function of the import and export management to use, it will be for internal usage and orderly management personnel and system. Entrance guard system can accurately and efficiently record of all events, effectively protect the lawful property of the use of personnel has been set up in advance, real-time monitoring, the function of post-mortem.

With the development of RFID technology and the deepening of the study and understanding, the advantages of the technology of RFID and use prospects got wide attention and recognition [2]. At the same time, the RFID public service system has been applied in all walks of life and played a very important role. In this paper, programmable controller (PLC) was applied to the elevator entrance guard control system, the control mode is easy to programming, easy to maintain, strong anti-jamming, safe and strong stability. Greatly improve the elevator safety, comfort, flexibility and maintainability, shorten the development cycle of elevators, and reduce the loss of the lift. PLC control system as the elevator control mode can meet the demand of the reliability, safety, comfort and so on, has become the current elevator control system of a kind of development trend.

An overview of the RFID radio frequency identification technology

RFID technology is a use of electromagnetic induction, no contact two-way communication, radio waves or microwaves through space coupling and transmit information through non-contacting's message and exchange data for the purpose of identification technology. On the basic theory of information transmission, based on RFID technology in low frequency transformer coupling model, at high frequencies the spatial coupling model based on radar target [3]. RFID technology is usually a tiny wireless transceiver tags to mark an object, the object in the RFID technology is called the object. Labels carry some information about the object data, infinite transceiver label by radio waves to launch these data into the nearby, speaking, reading and writing. Can read/write device of

the data collection and processing, and can be processed by computer and Internet or transfer them. RFID system is mainly composed of labels, legibility and Antenna (can Antenna) to be used in three parts, as shown in figure 1.

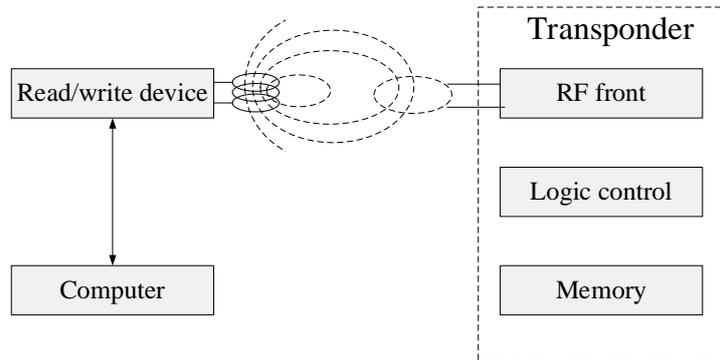


Figure.1 System schematic diagram of the RFID

Radio tags. Radio frequency tag is also called transponder or ID (IC) card, is composed of coupling components and chips, each tag has a unique electronic code. The chip module consists of radio frequency interface, access control, and memory.

Read/write device. It is the use of radio frequency technology to read or write ID card information equipment. In a radio frequency identification system, usually by computer application software to carry radio frequency ID card to write or read their data information.

Antenna. Established between antenna is used to read and write in the ID card and the data communication channel, the design of the antenna and location for the system's coverage, read distance and communication plays an important role in the accuracy of operation.

PLC programming technology

A part of the main control logic is realized by the controller and the PLC controller is responsible for receiving, computer instructions and related parameters, control and implement PLC; host controller is responsible for receiving controller instruction, to generate a global clock signal and the signal, realize the infrared tube emits logic control and infrared receiving tube scanning [4-5]. The main control logic realization of programmable logic control device hardware is shown in figure 2. Programmable logic control device includes a clock divider module, coding module, serial data transmission module.

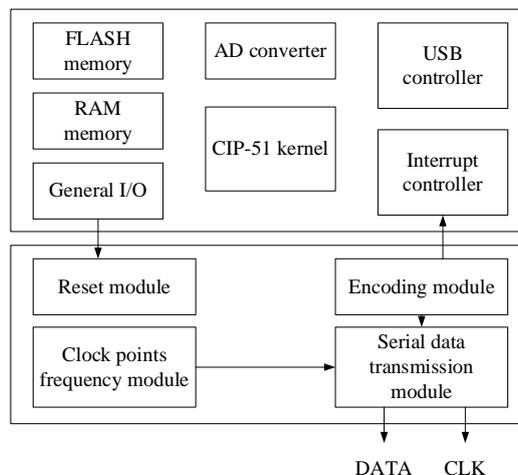


Figure 2. The logic circuit design of master controller

The clock frequency module to realize the production of a variety of synchronous clock signal. Touch screen system module using the same 40 MHz crystal active clock signal source, programmable logic control unit in the main controller module, clock input crystal, frequency module generates a clock signal provided to other modules required for programmable logic control

device, therefore, unified clock system consists of host controller programmable logic control device provides frequency, so you can make sure the synchronization signal of the various modules of the system.

The realization of decoding module is responsible for the whole control logic. To realize the control logic of the whole system is composed of a counter similar functional modules, the module receiving controller for synchronous trigger signal to start the calculation, and to send data to the serial data transmission module, calculation of infrared transceiver corresponding tube stop, so can realize the expansion of the infrared touch screen size and convenient.

Serial data transmission module based on IZC protocol, simple changes, the data transmission protocol between system modules, realizes the data signal and clock signal synchronous transmission, so that the touch screen coordinate system. Because the signal transmission distance is longer, while avoiding interference environment, the hardware of R signal transmission - 485 differential signal.

The design of the PLC entrance guard system based on RFID

Entrance guard controller circuit is the core of the entrance guard system, is composed of microprocessor and corresponding peripheral circuit, the controller is the system of the brain, by which to identify whether is the card of this system, whether the card is in a limited amount of time, so as to control the electronic lock is on. In order to satisfy the function of the system and implementation system of indicators, ID card and micro controller PLC control system, the entrance guard controller in carrying out the specific hardware platform design and build, ID card and entrance guard controller as the main design work. Entrance guard control system hardware circuit including: RF receive module, LF launch module, LF antenna design, low frequency receiving module, RF module and communication interface components, such as the overall diagram of hardware is shown in figure 3.

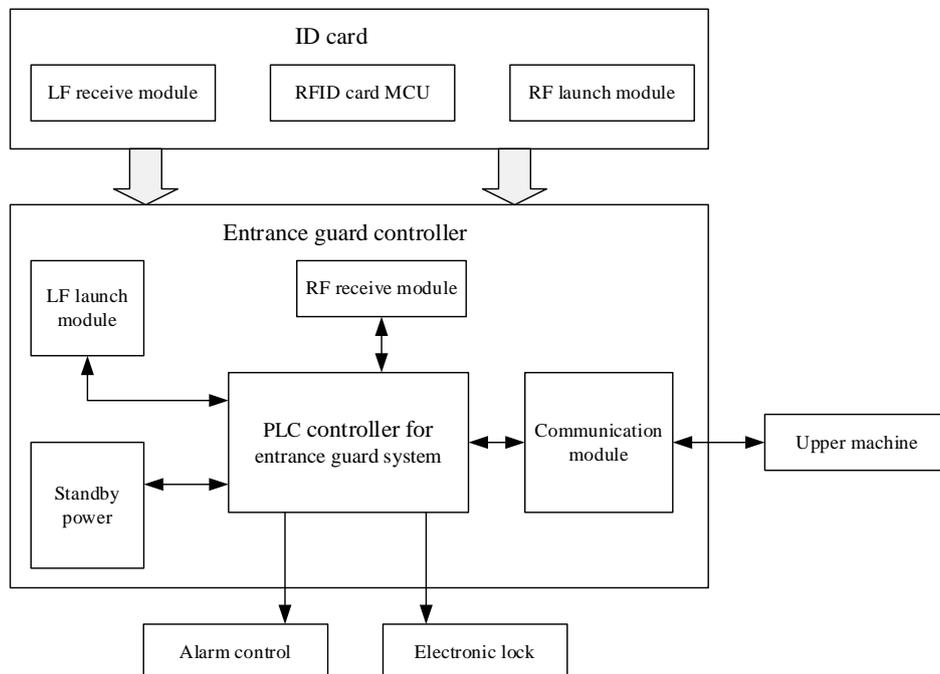


Figure 3. The PLC entrance guard system based on RFID

In order to reduce the power consumption of the system, and prolong the life time of the system, ID card and entrance guard controller when no signal input is under a state of sleep, PC can trigger signal to wake up the entrance guard controller, and the ID card is awakened by the launch of the LF entrance guard controller message signal to wake up. Entrance guard controller and USES a two-way wireless communication between ID CARDS, ID CARDS by LF receiving module,

entrance guard controller sends LF data reception entrance guard controller is sent via RF receive module receives the ID card of the RF data, using two-way communication can reduce the power consumption of the system, and the other between upper machine and entrance guard controller using RS 485 bus for data transmission.

Conclusion

With the development of society and people's material life level unceasing enhancement, the development of intelligent building and intelligent village will increasingly fast, intelligent entrance guard system as an important part can only be building security systems will be guarantee personal and property safety of the people of one of the main security measures. Intelligent entrance guard system will be more and more widely used. This article through the design of a simple RFID reader, with the PLC control system of the elevator at the same time a serial port communication, realize the entrance guard system rights management. This design USES the safety confirmation with dual authentication, the first layer of RF card reader to verify effectiveness, the second layer of PLC based on RF card to store data in logic judgment access. And intelligent entrance guard system and PLC, the scheme has the scalability, for subsequent higher security requirements to provide a solution, also can be applied to the elevator entrance guard internet of things development needs in the future.

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