

Design of Automatic Control System for Vehicle Communication Equipment Based on PLC

Qingguo Li

Hu nan Vocational College of Science & Technology, ChangSha, 410004, China

52086811@qq.com

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Abstract: Vehicle communication is the core of the automobile, and its main function is to help the vehicle maintain communication in the process of exercise. Because the traditional on-board communication equipment control system has always been vulnerable to interference and poor control accuracy in the actual use, the design of the on-board communication equipment automation control system based on PLC effectively solves the disadvantages of traditional on-board communication, and improves the anti-interference ability and control accuracy. bring great help to the exercise of vehicles. According to the vehicle communication automation control system based on PLC design, this paper analyzes in detail its design basic principle, main design steps, composition module and so on.

1. Introduction

Along with the continuous development of automation control system, the PLC based vehicle communication design breaks down the disadvantages of traditional vehicle communication equipment and becomes the mainstream design of vehicle communication at present. PLC module is used as the communication control center, the instruction signal is analyzed by using the modulation and demodulation unit, and finally the communication protocol and port are used to complete the communication planning, so as to improve the data accuracy based on the PLC vehicle communication, enhance its anti-interference ability and optimize the signal transmission, and ensure the stable operation of the automatic control system of the vehicle communication equipment.

2. The Basic Principles of Design PLC Automation Control System

2.1. Maximum Control Requirements

To ensure the improvement of accuracy and anti-jamming ability, it is necessary to achieve maximum control requirements, which requires the full play of PLC functions, which is also the premise of the design of vehicle communication automation control system based on PLC. As a result, in the design of vehicle communication automation control system based on PLC, we need to go deep into the market to investigate and collect the data of vehicle communication automation control system at home and abroad.

2.2. Ensure the Security of PLC Automatic Control Systems

As one of the important principles of designing PCL control system, it is necessary to analyze the system design, components and software programming in order to ensure its stable, safe and reliable operation.

2.3. Principles of Economy and Ease of Maintenance

For ensuring PLC automatic control system of vehicle-mounted communication equipment can be recognized and widely used in the market, it needs to bring huge economic benefits and social

benefits. In improving the quality while reducing the difficulty and cost of maintenance, to achieve maintenance convenience, economic benefits and other design principles.

3. Design of Vehicle Communication Automation Control System Based on PLC

3.1. Automation Module Design

Automation module design mainly includes: processor (CPU), memory, communication port, power supply, input and output interface and so on. As the core of the whole automatic control system of vehicle-borne communication equipment, CPU mainly carries on the logic operation, the data processing and issues the operation instruction to the data. The power supply is responsible for supplying the components of the whole automation module. Communication ports (Figure 1-1) are designed to help vehicles communicate data with external information, such as GPS, etc. memory is mainly used for PLC data storage. The input-output interface is the input and output of the internal and external data of the whole automation module.



Figure 1 PLC on-board communications

The control software module of on-board communication equipment automation system mainly includes program execution and user usage program[1]Through the interface operation mode, the user uses the software module to carry on the effective control to the on-board communication equipment automation control system, not only facilitates the user to use, also has reached the precision, the subtle degree to control. Different from the traditional software module, the PLC based software module optimizes the logic control ability and improves the control accuracy.

PLC technology in the automation module operation mode mainly through the way of cyclic scanning, from the input port cyclic scanning and reading information. PLC technology carries on the related operation according to the instruction issued by the system, carries on the execution one by one according to the order set by the system. in addition, the PLC technology can control the update and execution of the automatic control system through the transmission of signals, which has a higher efficiency ability than the traditional automatic control system.

3.2. PLC Control Module Design

Control module design in the core module (Figure 1-2) is the PLC technology, the main role of PLC technology is to receive commands to execute. Automatic control system of vehicle communication based on PLC is mainly accomplished by two control chips, data exchange and control signal[2]. In the design of the control module, the main task is to set up and apply the information of the data, and the principle of the design is to write the relevant commands in the format of combining the PLC technology according to the length of the data, the order of the data and the data identification code, etc.



Figure 2 PLC on-board communications

3.3. PLC Orders

The following commands are commonly used in PLC techniques: A、LD、LDN、AN、ON、S、R\S.. LD is to take instructions: take instructions mainly represents a normal open contact instructions connected with the input bus, often open contact instructions that often open contact logic operation start. LDN's a counterinstruction[3]: It mainly represents a normally closed contact instruction connected to the input bus, That is, often closed contact logic operation start. A representation and instruction: it is mainly used in series with a single normally open contact. AN refers to a series with non-instructions: mainly used for a single normally closed contact. ON refers to or is not directed: it is used in parallel with a single normally closed contact. positive, negative jump ED, etc. After a positive jump (ON) is detected, enables streaming to connect a scan cycle. The main function of EU command is to detect a negative jump (OFF), enables streaming to connect a scan cycle. Output "==" symbol, Vehicle communication equipment automation control system in the execution of output instructions, The specified parameter bits in memory are now switched on. S、R\S, are the position and reset instructions in PLC technology And when the position instruction "S", N points the automated control system will start with bit or OUT specified address parameters are set. And when you use the R" instruction, Perform reset instructions, N points starting with the bit or OUT specified address parameters are reset.

4. Design of Vehicle Communication System

In the design process of vehicle-borne communication system, two main components are designed: vehicle-borne communication module and vehicle-borne communication antenna module. As the name implies, the function of the transceiver is to collect the information and send out the specified information, so as to realize the control of the automatic control system of the on-board communication equipment, realize the communication between the vehicle bus and modulate and demodulate the received radio wave, and convert it into the system.[4]between identified information and submitted to CPU for processing. And the role of on-board transceiver is different according to different transceivers, such as: PLC control unit, bus interface, control interface, modulation and so on.

communication unit in the design of communication system (figure 1-3), mainly according to the detailed information data in the user program and feedback program to enter and set the PLC vehicle communication equipment automation control system. As a bridge of communication, high-speed single-chip microcomputer is the key point of modulation and demodulation unit, its main function is to use the specific information sent by feedback unit, such as signals, radio waves for modulation and demodulation. In order to facilitate the control unit to transmit data information, the control interface is used to transmit control instructions. A transceiver provides and identifies useful radio waves while improving accurate GPS intelligence and feeds them back to an automated control system. In the vehicle communication automation control system, it is necessary to use serial communication for instruction transmission to satisfy the high speed communication of

multiple port channels. In the design of on-board communication system, we also need to consider the electric energy and signal intensity of signal transmission, which can provide effective electric energy for signal transmission by using the function of transmitting circuit, and then use its transmission characteristics to process the electric wave signal, so as to realize the signal exchange of on-board communication.



Figure 3 PLC on-board communications

Besides the above-mentioned on-board communication design, the communication mode based on PLC technology has developed free communication interface, multi-point communication interface and single-point communication interface in order to solve the problem of single mode of traditional communication and unable to carry out multi-point communication.

During the design process of vehicle communication based on PLC, we need the idea and design function of modulation and demodulation unit software to help the communication port of PLC technology to realize communication. Therefore, by using the idea of software design of modulation and demodulation unit, the author designs[5]The more bytes a vehicle-borne communication device transmits, the more powerful it becomes. Among them PLC the data transmission target of vehicle communication is the transmission address of the system, and the port is configured and adjusted by byte adjustment to complete the design of port communication system, improve the quality of vehicle communication information transmission, and improve the anti-interference ability of vehicle communication.

5. Summary

As a result, in order to solve the problem of the traditional on-board communication automation control system, a PLC-based on-board communication equipment automation control system is developed, which not only effectively improves the anti-jamming ability of vehicle communication, but also greatly improves the accuracy and signal intensity of vehicle communication. According to a large number of application data, PLC technology can improve the stability and reliability of the vehicle communication automation control system after applying the vehicle communication. Besides, PLC technology can not only be limited to the vehicle communication in the automatic information control system, but also can improve its practical application ability to other equipment, so that the PLC technology can better serve mankind.

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