基于单片机的交通灯控制系统设计

Design of traffic light control system based on MCU

摘 要

近些年来，科学技术蓬勃开展，在这场信息的大革命中，微电子，计算机和通讯等技术一直处于当先位置。作为三者中最重要的计算机技术在与实际应用的有效结合和运行方面显得尤为关键。单片机作为计算机技术中重要的一部分，越来越多的出现在我们的生活中，被频繁的应用到简单和和复杂的控制系统中，从最简单常见的的微波炉、遥控器、全自动洗衣机、电动牙刷到导弹导航装置、机器人、智能仪表、医疗设备等。单片机为主，其他辅助组件为辅，针对用品特性，软硬件相互配合互相合作完成希望效果，这些生活用品与单片机的结合不仅便利了我们的生活也推动了传统控制检测的更新。

车辆来回穿梭，行人熙熙攘攘，但井井有条，都是交通灯自动控制系统的智慧成果。实现交通信号灯的控制方法有很多，本系统全部采用直流供电，利用 74HC164 串入、并出移位寄存器、74LS04 反向器组件，7805 三端稳压电源等组件，主要元器件 AT89S51 系列单片机实现交通灯控制系统。信号灯的红色和绿色光由 AT89S51 芯片的 P1 端口设置。交通灯的照明由 12 个 LED 来实现，时间的显示由 8 个 LED 七段数码管来分别实现数字 0-9。考虑到稳定性和可靠性，引入了一个"看门狗"芯片集成在其中，避免了停机等电路故障。该系统不仅实用，而且操作简单，可扩展。

关键词：交通灯 控制 显示

Abstract

In recent years, science and technology have been developing vigorously. In this information revolution, microelectronics, computer and communication technologies have been in the leading position. As the most important of the three, computer technology is particularly crucial in the effective combination and operation with practical applications. Single chip microcomputer as an important part of the computer technology, more and more appear in our life, is frequently applied to the simple and complex control system, from the most simple and common microwave ovens, remote control, automatic washing machines, electric toothbrush to missile navigation devices, robot, intelligent instrumentation, medical equipment, etc. Single-chip microcomputer mainly, other auxiliary components for auxiliary, according to the characteristics of supplies, hardware and software cooperate with each other to achieve the desired effect, the combination of these daily supplies and single-chip microcomputer not only facilitates our life but also promotes the update of traditional control and detection.

Traffic back and forth, pedestrians bustling, but orderly, are the intelligent results of the automatic control system of traffic lights. There are many ways to control traffic signal lights. The system USES dc power supply, USES 74HC164 series in and out shift register, 74LS04 inverter component, 7805 three-end voltage regulator and other components, the main components AT89S51 series single-chip microcomputer to realize the traffic light control system. The red and green lights of the signal lamp are set by the P1 port of AT89S51 chip. The lighting of traffic lights is realized by 12 LED, and the display of time is realized by 8 LED and 7 digital tubes, respectively to achieve the digits 0-9. Considering the stability and reliability of the system, a "watchdog" chip is introduced to avoid circuit failure such as shutdown. The system is not only practical, but also easy to operate and expandable.

Key words: traffic lights   control   display

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