基于单片机的无线数据传输系统设计

摘　要

温度数据作为长久以来工业领域非常重要的一个检测指标，其检测方式、检测精度和检测范围一直都是研究的重要方向，任何一个领域的突破都可以为工业生产带来巨大的经济效益以及提高工作效率。

本文构建了一个基于 STC89C52 单片机的无线数据传输系统，将温度数据以无线通信的方式从下位机传输给上位机，整个系统主要分发送端与接收端。发送端系统通过 DS18B20 温度传感器采集温度信息，经过单片机处理后，nRF24L01 无线传输模块设置为发送模式将温度信息发送至接收端，接收端的单片机接收到温度信息后，将 DS1302 提供的时间信息和温度信息同时显示在 LCD1602 上。系统还包括了调控时间信息的键盘模块和温度超值后的报警模块。根据整个的设计内容，分四个部分进行描述：方案选择、硬件电路、软件编写、实物制作与调试。方案设计构建了整个系统的框架，并选择合适的器件以完成设计任务；硬件设计主要是电路设计，主要介绍了温度传感器 DS18B20 和无线收发模块 nRF24L01 的引脚功能及其与单片机的连接电路；软件编写部分主要在于实现温度采集和无线传输的功能；最后完成实物制作验证了整个方案的可行性。

软硬件的结合使得单片机的优势得以显现，经过编译调试，温度数据传输系统的设计满足了任务要求，无线传输的方便性也得以体现。

关键词：STC89C52，温度采集，无线数据传输，nRF24L01

ABSTRACT

As a very important indicator in the industrial field for a long time, temperature data has always been an important research direction, and breakthroughs in any field can bring huge economic benefits and improve work for industrial production effectiveness.

In this paper, a wireless data transmission system based on STC89C52 single-chip microcomputer is constructed. The temperature data is transmitted from the lower computer to the upper computer by wireless communication. The whole system is mainly divided into the transmitting terminal and the receiving terminal. The transmitting terminal system collects temperature information through the DS18B20 temperature sensor. After processing by the single-chip microcomputer, the nRF24L01 wireless transmission module is set to send mode to send temperature information to the receiving terminal. After receiving the temperature information, Display the time information and temperature information provided by the DS1302 on the LCD1602 simultaneously, The system also includes a keyboard module that regulates time information and an alarm module that is temperature-valued. According to the whole design content, it is described in four parts: program selection, hardware circuit, software writing, physical production and debugging. The scheme design builds the framework of the whole system and selects the appropriate device to complete the design task. The hardware design is mainly the circuit design. It mainly introduces the pin function of the temperature sensor DS18B20 and the wireless transceiver module nRF24L01 and its connection circuit with the single chip microcomputer, The software writing part is mainly to realize the function of temperature acquisition and wireless transmission. Finally, the physical production is completed to verify the feasibility of the whole scheme.

The combination of software and hardware makes the advantages of the single-chip microcomputer appear. After compiling and debugging, the design of the temperature data transmission system satisfies the task requirements, and the convenience of wireless transmission is also reflected.