

电子台秤的设计

摘 要

随着科学技术的不断突破，称重技术的技术要求也不断在提高。虽然在目前台式电子秤技术已经深入商业贸易的方方面面，但在个人或家庭使用方面，它的缺点十分明显：体积大、高成本、不便携带，最重要的还是工频交流电才能作为它的电源供应。这些都使得它的应用场所受到了极大的制约。目前现存的便携式秤多为通过杠杆或弹簧形变来实现计量的弹簧秤，甚至大多数居民用户还在广泛使用国家已经明令淘汰的杆秤。一直以来，人们期盼着精准、便携、廉价的电子秤投放市场。

在集成化、芯片化大肆发展的现今，本文基于单片机技术设计了一款小巧便携的电子秤。该电子秤由电阻应变片式压力传感器、STC89C52 单片机、LCD1602 液晶显示屏、电子秤专用 24 位 A/D 转换芯片 HX711、按钮矩阵键盘、蜂鸣器和警示灯（红色发光二极管）等元件构成。它的称量上限为 5kg, 精确度为 0.005kg, 主要功能除了电子秤基本的称量、单价输入和计价的功能外，还可以手动去皮、进行质量单位转换、声光报警等。

该电子秤解决了台式电子秤体积大、成本高、不易携带的缺点，更兼具了台式电子秤测量精确、称量速度快的优点，最重要的是操作简便。面对一般居民家庭的使用需求，该电子秤即可满足，是一种具有光明前景的小型化设备。

关键词：电子秤；称重传感器；A/D 转换器；8051 单片机

Abstract

With the continuous breakthrough of science and technology, the technical requirements of weighing technology are also improving. Although at present, desktop electronic scale technology has penetrated into all aspects of commercial trade, but in personal or household use, its shortcomings are very obvious: large size, high cost, not inconvenience to carry, the most important thing is that AC power can be used as its power supply. All these make its application place subject to great restriction. At present, most of the existing portable scales are spring scales that are measured by lever or spring deformation, and even most resident users are still widely using the pole scales that the state has explicitly moisturized. For a long time, people have been looking forward to cheap electronic scales which can measure accurately and be carried conveniently on the market.

Nowadays, with the development of integration and chip, a small and portable electronic scale which based on single chip microcomputer technology is designed in this text. The electronic scale is composed of resistance strain gauge pressure sensor, STC89C52, LCD1602, 24bit A/D conversion chip HX711, button matrix keyboard, buzzer and warning lamp (red light-emitting diode). The upper limit of its weighing is 5 kg and the cent degree is 0.005 kg. The main functions in addition to the basic weighing, unit price input and accumulation computation, but also manual shelling, quality unit conversion, acousto-optic alarm and so on.

The electronic scale solves the shortcomings of large size, high cost, not inconvenience to carry, and also has the advantages of accurate measurement and fast weighing speed. The most important thing is that the operation is simple. In the face of the use needs of ordinary residents and families, the electronic scale can be satisfied, and it is a kind of miniaturized equipment with bright prospect.

Keywords: Electronic scales ; Weighing sensor ; A/D conversion ; micro-controller 8051

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