基于单片机的太阳能充电器设计

中文摘要

目前，面对化石能源的枯竭和环境的不断恶化，人们更加关注节约资源和保护环境的问题。然而，化石能源是有限的，寻找清洁替代能源的问题变得越来越迫切。太阳能作为可再生资源脱颖而出。太阳能具有取之不尽，用之不竭，清洁安全的特点。因此，它具有广阔的应用前景，光伏发电技术受到越来越多的关注。随着光伏组件价格的不断下降和光伏技术的发展，太阳能光伏系统将逐步取代其他能源发电系统。而在现代生活中，手机成为人们的主要通讯工具，甚至是购物娱乐工具，成为外出旅游的必备，但由于没有随时成点的条件，经常耽误手机的使用。为了解决这个难题，本课程设计介绍一种太阳能手机充电器，利用单片机控制，将太阳能经过电路变换为锂电池的稳定直流电给手机充电，并能在电池充电完成后立即停止充电，也就作为一种直流电源来使用，从而摆脱对市电的束缚。这样，不仅解决了手机随时充电的问题，且使用太阳能这一清洁能源，安全方便。根据国内外资料和实际充电器状况的研究，本文所设计的基于单片机的智能充电器能够实现利用太阳能对手机进行智能化充电、安全保护、充满提示等功能，而且方便携带，智能环保，有效的解决了手机在野外无法充电的问题。

本设计的硬件主要包括液晶显示模块，充电芯片模块，太阳能模块，软件部分使用 C 语言编写，利用 KIEL 开发平台。在经过软件硬件联合调试后，可以满足野外和家居使用，符合节能和环保标准，具有较为广泛的市场应用前景，同时也能够带来巨大的经济和社会效益

关键词：太阳能，单片机，充电器，液晶显示

Abstract

At present, facing the depletion of fossil energy and the deterioration of the environment, people pay more attention to saving resources and protecting the environment. However, fossil energy is limited, and the problem of finding clean alternative energy is becoming more and more urgent. Solar energy stands out as a renewable resource. Solar energy is inexhaustible, inexhaustible, clean and safe. Therefore, it has broad application prospects, and photovoltaic power generation technology has attracted more and more attention. With the price of photovoltaic modules declining and the development of photovoltaic technology, solar photovoltaic system will gradually replace other energy generation systems. In modern life, mobile phones have become people's main communication tools, even shopping and entertainment tools, and become necessary for travel. However, due to the lack of ready-to-use conditions, the use of mobile phones is often delayed. In order to solve this problem, this course introduces a solar cell phone charger, which is controlled by a single chip computer. The solar energy is converted into a stable direct current of lithium battery to charge the cell phone. It can stop charging immediately after the battery is charged. It is also used as a DC power source to get rid of the restriction of the market electricity. In this way, it not only solves the problem of charging mobile phones at any time, but also uses solar energy as a clean energy source, which is safe and convenient. According to the research of domestic and foreign data and actual charger status, the intelligent charger based on single chip computer designed in this paper can realize the functions of intelligent charging, security protection, full of tips and other functions by using solar energy for mobile phones, and it is convenient to carry, intelligent and environmental protection, effectively solving the problem that mobile phones can not be charged in the field.

The hardware of this design mainly includes LCD module, charging chip module, solar module, and the software part is written in C language, using KIEL development platform. After the joint debugging of software and hardware, it can meet the requirements of field and home use, meet the standards of energy saving and environmental protection, and has a broad market application prospect. At the same time, it can bring huge economic and social benefits

Key words: solar energy, MCU, charger, liquid crystal display

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