抗辐照电源设计与测试

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摘　要：(高能物理电子学读出系统的重要性)在高能物理电子学读出系统中供电电源是非常重要的一个组成部分，对电源也提出了抗辐照、低噪声、多通道、具有一定的输出电流和电压能力的要求。(别人的研究现状)鉴于些，我们设计了一种抗辐照 16 通道输出的电源系统。该电源系统由两块一样的电源板级联而成，根据接入控制器的方式不同自动识别主从板。每一个电源通道具有上电死锁、电压电流监测，过流保护等功能。首先介绍了整个系统的框架，然后以设计框架为基础分析系统硬件各个了模块的工作原理及实现方法。最后，对整个电源系统进行测试，并分析测试结果和测试软件的设计。经测试证明，该电源系统具有良好的抗辐照能力，输出电压电流均满足设计要求。

关键字： 电源；抗辐照；电压；电流；

Radiation-hardened power supply system design and testing

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Abstract: Power supply is a significant important component in the electronic readout system of high energy physics. There are some requirements for power supply such as radiation-hardened, low noise, multichannel output, and voltage and current output capacity. In view of this, we designed a radiation-hardened power system with sixteen channels output. Two identical power supply boards are cascaded in this power supply system, which can automatically recognize the master board that is connected to the controller from the slave board. Each power supply output channel have latch-up during power-on, output voltage and current monitoring, over-current protection and so on. Firstly, we introduce the structure of the entire system, then we analyze operating principle and realization method for every module of system hardware. Finally, we test the entire power supply system and analyze the testing results, then give the structure of software for testing. The testing results verify that the power supply system has prominent radiation-hardened capacity and the output voltage and current meet the designing requirements for the electronic readout system in high energy physics.

Keyword: Power supply; radiation-hardened; voltage; current;