基因扩增仪温度控制系统

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**［摘要］**为了满足PCR仪温度控制升降速度快，精度要求高等特点，设计一种基因扩增仪的温度控制系统，它以ARM芯片作为核心，由半导体制冷片、调理模块、驱动模块等组成.系统采用WINCE实时操作系统，用Platform Builder 50及Embedded Visual C++作为软件开发平台，采用时间最优的Bang-Bang PID控制算法，开发出完全抢占式控制系统，可较好地完成基因扩增仪的热循环过程.经测试结果显示，该系统能够满足基因扩增仪对升降温度以及精度的要求，具有无污染、无噪音、寿命长、界面友好、性能可靠、响应速度快、硬件可剪裁、软件可扩展等特点.

**[关键词]** 嵌入式系统；温度控制；半导体制冷片；基因扩增仪

Development of the Temperature Control System for Gene Amplification Instrument

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**Abstract**:In order to meet the requirements of fast temperature control and the high precision for PCR,a temperature control system which uses ARM chip as the core was introduced in this paper.The system was composed of semiconductor refrigeration piece,conditioning module,drive circuit module and so on.The temperature control system took use of the WINCE real-time operating system with Platform Builder 5.0 and Embedded Visual C++ being the software development platform.The control algorithm adopted the optimized Bang-Bang PID control to develop a fully preemptive embedded system.The system can be accomplished the thermal cycle of gene amplification satisfactorily.Test results showed that the control system can meet the gene amplification requirements on accuracy and the speed of heating or cooling,having the advantages of no pollution,no noise,long life,friendly interface,reliable performance,fast response speed,flexible hardware which could be cut out,software extensibility and so on.

**Key words**:embedded system;temperature control;semiconductor refrigeration piece;gene amplification instrument