Protean Alarm Clock
Final Presentation

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14 April 2009
Abstract

This project will consist of a stand-alone alarm clock with dynamic features designed to wake the user quickly and effectively. The alarm's sound will be unpredictable, and the user will have to think and interact with the clock to turn the alarm off. The technical challenges of the project will be primarily software-related: writing the programs to allow the user to set the clock and the alarm, as well as programs to control the alarm and the routines to allow the user to shut it off. Hardware challenges will deal with the implementation of the speaker and display screen for the clock and a variety of different sensors that will be used in the disabling routines.
Features

The Protean Alarm Clock:

• digitally displays the time as set by the user
• sounds an alarm at one user-selected time
• "randomly" choose an alarms from among pre-stored sounds
• requires that the user answers four random questions in order to disable the alarm
• runs on one 9V and 4 AA batteries
Detailed System Diagram

LCD receives text display information

Push buttons send pulses to indicate user selections

Tri-color LED receives one of four permutations of on/off

Comparator sends digital input from user indicating dial position

Alarm receives PWM signals from processor’s interrupt

Figure 1
Software Flowchart

Figure 2
Technical Challenges

• CPLD logic design
• Interrupts
• Waveform creation/signal amplification
• Debouncing switches
• Coordinating user input with software
Final Cost

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<tr>
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<td>buzzer</td>
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Table 1. Final Cost
Bibliography


