Default Alarm Clock Module

(CPE 324 Default Lab 9 Assignment)

The default Lab 9 assignment is the creation of a digital alarm clock module and implement it on the DE2-115 trainer. This is an individual or group assignment with a maximum size group of two people. The project is designed to build upon other assignments in CPE 324 and the CPE 322 class. You may expand these assignments and integrate external Intellectual Property modules that have been provided in the course.

Requirements:

* ~~The Alarm Clock Module should continuously visually display the time of day, showing the hours, minutes and seconds. Time can be in either 24 hour format or 12 hour format. In the case of 12 hour format there must be a AM and PM indicator.~~
* ~~Time should be accurate to within two minutes per year.~~
* ~~There is to be an ergonomically designed mechanism for the user to manually set the time.~~
* ~~There is to be a similar method for the user to set an alarm time which the clock module will remember and use to generate an alarm signal when the current time of day is equal to the alarm time.~~
* ~~The alarm time should be able to be set by the user without affecting the clock’s main time of day operation (it is okay though if the display switches over to the alarm time during the alarm set operation)~~
* ~~The alarm should be an audible signal or combined audio-visual signal that is loud enough to wake the user.~~
* ~~The alarm signal should be able to be reset by the user by pressing a button.~~
* ~~The maximum time for this alarm signal should be on if not reset by the user is 5 minutes.~~
* ~~The alarm clock module should be prototyped on the DE2-115 Educational Trainer.~~

Implementation

24 hr clock

* 24 hour behavioral design from homework
* output on HEX display - set pins
* set clock time
  + SW0 to enter set clock mode
  + SW1 to edit seconds, SW2 to edit minutes, SW3 to edit hours
  + KEY0 to increment current selection

Alarm

* set alarm time without affecting clock
  + SW4 to enter set alarm mode
  + SW1 to edit seconds, SW2 to edit minutes, SW3 to edit hours
  + KEY0 to increment current selection
* alarm sound - 5 minutes
  + use lab6 part b verilog module
  + limit to 5 minutes max if not reset
* reset alarm
  + KEY2 to cancel alarm
  + LEDG8 to indicate active alarm