MEMORANDUM

**TO:** ECE130 Spring 2001

FROM: Jianjian Song and Mark Yoder

SUBJECT: Request for a multi-function digital clock, stop watch, and phone book

DATE: 30 April 2001

A Design and Verification of a Multi-function Device

A multi-purpose device (digital clock, stopwatch and phonebook) is to be designed and simulated with LogicWorks. A rough block diagram is shown below. You are free to add whatever necessary devices.
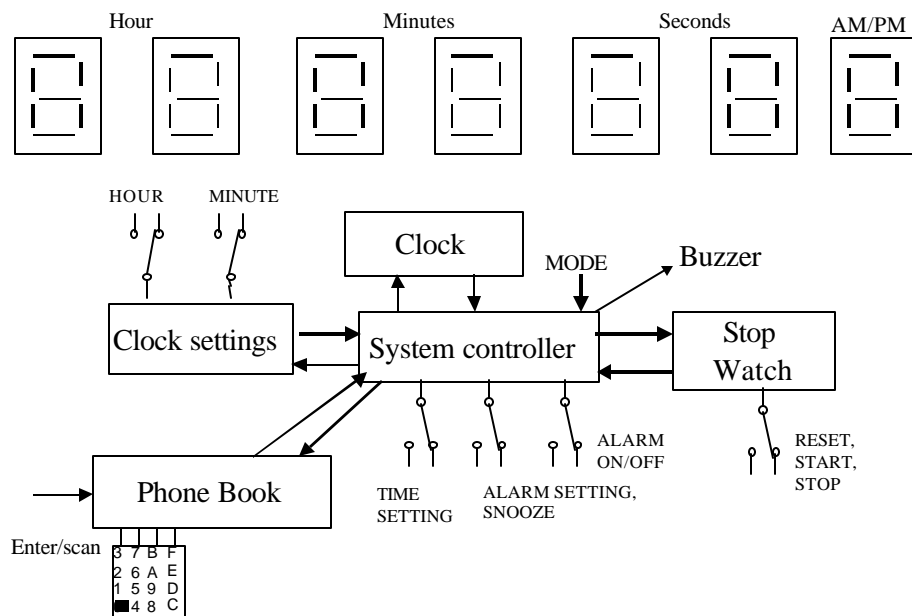
A.1 The Digital Clock

The clock has seven digits: two for hours, two for minutes, two for seconds, and one for AM/PM.

The time can be set by depressing and holding TIME SETTING key while pressing either HOUR or MINUTE setting key to change the hour or minute. The clock will resume normal operation when the TIME SETTING button is released.

The ALARM SETTING/SNOOZE button is used to set the alarm time. When the button is depressed and held, the HOUR and MINUTE buttons can be pressed to set the alarm time. The alarm time is set when the ALARM SETTING/SNOOZE button is released. The alarm is activated by the ALARM ON/OFF button.

When the alarm is activated, a buzzer will make sound. If the `ALARM SETTING/SNOOZE` button is depressed once while the buzzer is on, the clock will enter `SNOOZE` mode for 30 seconds. The buzzer will be turned on again until the `ALARM ON/OFF` button is pressed to turn off the alarm.

A.2 The Stopwatch

When the `MODE` button is depressed once, the clock is changed to a stopwatch. The `RESET, START, STOP` button can then be used to reset, start and stop the stopwatch. The display will be changed to display seconds and minutes during the stop watch mode.

A.3 The Phone Book

When the `MODE` button is depressed again, the phonebook is activated. The phone book can store up to 16 telephone numbers of seven digits each. It uses the same display as the clock.

The user should be able to enter and store new phone numbers through a hexadecimal keypad and flip through the book to see the stored phone numbers.

Pressing the `MODE` button again returns the device to normal clock mode.

B   Schedule and reports

The project is to be completed in three weeks starting Monday 30 April. A team of 5 to 6 engineers is assigned to work on the project. Each engineer is required to spend 12 hours per week on the average. Therefore, a total of 216 hours of engineer's time will be allocated.

Here is a list of expected results. All the reports are due by the end of the day and will carry 20% late penalty for each day that is late.

(1)   Selection of team leaders and group leaders are due by Thursday, May 3. Names of the leaders should be submitted to me.

(2)   A draft report on project definition, plan and schedule that is due on Friday, May 4. This report includes Sections 1 to 4 of the proposed final project report attached to this memo.

(3)   A draft design report on state diagrams and circuit designs for the modules on Thursday, May 10.

(4)   A draft report on module circuit verification procedures and results on Monday, May 14.

(5)   A final project report on Wednesday, May 16, in the morning.

(6)   Oral presentation on Thursday or Friday, May 17 and 18.

Here are the expected schedule and deadlines:

Task and deadline	Week day (starting Monday 30 April)														
	30-Apr	1-May	2	3	4	7	8	9	10	11	14	15	16	17	18
Leader selections															
Project definition & plan															
State diagram and circuit design															
Module verification report															
Oral presentation															
Final project report															

Your draft reports should have detailed description of the required topics as well as a summary to include the following:

1. Work completed
2. Current work
3. Future work
4. Red flags (anything that might cause major problems)

Your reports should include major components and diagrams and schematics. They will be evaluated mainly on clarity and completeness. Diagrams can be hand-drawn as long as they are clear and accurate. The draft reports don't need to be typed but the final report should be done on a word processor although the graphs and diagrams can be hand-drawn.

 A soft copy of the proposed final report contents will be distributed by email to all students.

C   Manpower Allocation

The class is divided into teams of 5 to 6 students each. It is up to each team leader to decide how to distribute tasks to each member of the team or how to divide the team into groups.

Each team will select a team leader and each group will select a group leader. The team leader will be responsible for the overall project: scheduling, manpower management, reports, major decisions, etc. Each group leader will report to the team leader and will be responsible for the group activities.

D   Mandatory Attendance

Every student must be present in the classroom during lecture hours to work on the project. An attendance check-off list will be distributed to record student presence.

Individual student's project grade will be the group's grade multiplied by his or her attendance percentage.

E   Grading Policy

The detailed grading policy is attached to this memo.