TALKING CLOCK

Fall 2002 Semester
GROUP MEMBERS

Jas Jhajj
Neha Pandya
Cathy Wilcox
OVERVIEW

♦ Introduction
♦ Prior Work
♦ Regulations
♦ Software Design
♦ Hardware Design
OVERVIEW

♦ Schematic
♦ Problems Encountered
♦ Conclusions
♦ Questions
INTRODUCTION

♦ Purpose Statement:

The purpose of this project was to create a clock with features that enable the consumer to change the time and hear the current time being said with the push of a button.
PRIOR WORK

www.uspto.gov
PRIOR WORK

U.S. Patent 5,867,452:

Wrist watch
PRIOR WORK

U.S. Patent 5,663,714:

Digital Play Back Device
PRIOR WORK

U.S. Patent 6,190,329:

Thermo-scan
www.osha.gov
REGULATIONS

1910.304(a)(1):

Identification of conductors
REGULATIONS

1910.304(a)(3):

Use of grounding terminals and devices
## TIME LINE

<table>
<thead>
<tr>
<th>Description</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
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<tbody>
<tr>
<td>Group Selection</td>
<td>3 10 17 24</td>
<td>1 8 15 22 29</td>
<td>5 12 19 26</td>
<td>3 10 17 24</td>
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<td>Project Selection</td>
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<tr>
<td>Start Project</td>
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<tr>
<td>Understand Requirements</td>
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<tr>
<td>Define Problem Statement</td>
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<td>Conduct Research</td>
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<td>Develop Objective Tree</td>
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<td>Define Functional Requirements</td>
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<td>Generate Alternatives</td>
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<td>Evaluate Alternatives</td>
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<td>Conduct Test</td>
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<td>Document Design Process</td>
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<td>Presentation</td>
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<tr>
<td>End Project</td>
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Start Date: 10/26/02
End Date: 12/17/02
Presentation Date: 12/10/02

### Important Dates
- September
- October
- November
- December
OBJECTIVE TREE
Talking Clock

- Inexpensive
- Marketable
- Durable
- Easy to operate
- Safe
- Sealed Well
- No Sharp Edges

Follow Federal Regulations

Simple Buttons

Accurate Time
SOFTWARE DESIGN

✧ Real-Time Clock
✧ 26 Stored Messages in Ram
✧ Talk Code
SOFTWARE
DESIGN/PRECAUTIONS

♦ If we press the talk button, the microprocessor could pause incrementing the clock.

♦ Pressing the talk button more than once.
FLOW CHART

Store Time value

Say "The time is"

Say the hour value

Say the minute value
HARDWARE/FUNCTIONALITY

12:00:00 AM

Speaker

Hour  Min.  Reset  Talk
Sec.
## COST ANALYSIS

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<tr>
<th>List of Parts</th>
<th>Part Description</th>
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<td>Motorola Boards</td>
<td>CME-11E9-EVBU Board</td>
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<td>LCD Display</td>
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<td>Voice Chip</td>
<td>IC, ISD25120P Single Chip Voice Record/Playback Device-Jameco 141655</td>
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<td>Speaker</td>
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<td>Microphone</td>
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<td>Push Button</td>
<td>Television Parts</td>
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<td>Resistors/Capacitors</td>
<td>Various Resistors (1K, 10K, 100K, 470K, 6.1KΩ)</td>
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<td></td>
<td>Various Capacitors (0.1, 4.7, 22, 220 µF)</td>
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<td>Accessories</td>
<td>Display Box</td>
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**Total**                                                                 $117.93

**Total without the board**  $17.93
DEMONSTRATION
Problem 1: Finding a 16-ohm speaker

Solution 1: We used old parts.
PROBLEMS ENCOUNTERED

Problem 2:
We were not receiving any output for the speaker because the micro-controller did not recognize the memory locations where we had stored messages.

Solution 2:
TBD
PROBLEMS ENCOUNTERED

Problem 3:
The pins 3 and 7 of Port A are not functioning.

Solution 3:
We used some pins from Port D.
Problem 4:
The time delay between each segment of time is inconsistent.

Solution 4:
TBD
DESIGN ALTERNATIVES

♦ Holding – registers which indicate how to access the actual registers.
♦ Minimize the number of buttons.
♦ Use SPI.
PREPARING FOR THE MARKET

♦ Overall packaging of the talking clock could be more pleasing to the eye
♦ Include warning labels on the box
♦ Creating a tightly-closed container
  – child-proof
1. Clock speaks the time as the time is being changed
2. Incorporate an alarm option
3. Recording feature
4. For the vision-impaired, label each of the buttons in Braille
5. Play a hourly chime
# Division of Work

<table>
<thead>
<tr>
<th>Project</th>
<th>Jas Jhajj</th>
<th>Neha Pandya</th>
<th>Cathy Wilcox</th>
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<tbody>
<tr>
<td><strong>Real Time Clock</strong></td>
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<td>Project Report</td>
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QUESTION / ANSWER SESSION