



Home Alarm System Mid-term progress report



By Frode Aarebrot

Presentation overview

- ▶ System overview
- ▶ Design choices
- ▶ Operation of system
- ▶ Operation of components
- ▶ Problems
- ▶ Timeline
- ▶ Meeting deadlines
- ▶ Possible additions
- ▶ Conclusion
- ▶ Questions



System overview

- ▶ **8051 Microcontroller**
 - ▶ Polls sensors when armed
- ▶ **Keypad**
 - ▶ 12 button input (0-9, # and *)
- ▶ **Motion sensors**
 - ▶ About 20 ft. range
- ▶ **Door sensor**
 - ▶ Magnetic switch, triggers when door opens
- ▶ **Speaker alarm**
 - ▶ Sounds alarm if system is triggered
- ▶ **DTMF Dialer NTEI690**
 - ▶ Generates standard DTMF tones



Design Choices

- ▶ **8051 Microcontroller**
 - ▶ Known architecture
 - ▶ Simple, yet efficient
- ▶ **4 Sensors, any combination of Motion and Door**
 - ▶ Limited number of inputs
 - ▶ Uses CAT5 for easy wiring
- ▶ **16 character by 2 line display**
 - ▶ Considered 16 by 4, but no need for 4 lines
- ▶ **Audible alarm using speakers**
 - ▶ Cheaper than horn
 - ▶ Not good enough for a live system
- ▶ **Software**
 - ▶ Save 4 digit password in Code segment
 - ▶ Save 10 digit phone number in Code segment
 - ▶ Allow user to change password and phone number (IAP)



Operation of system

▶ Unarmed

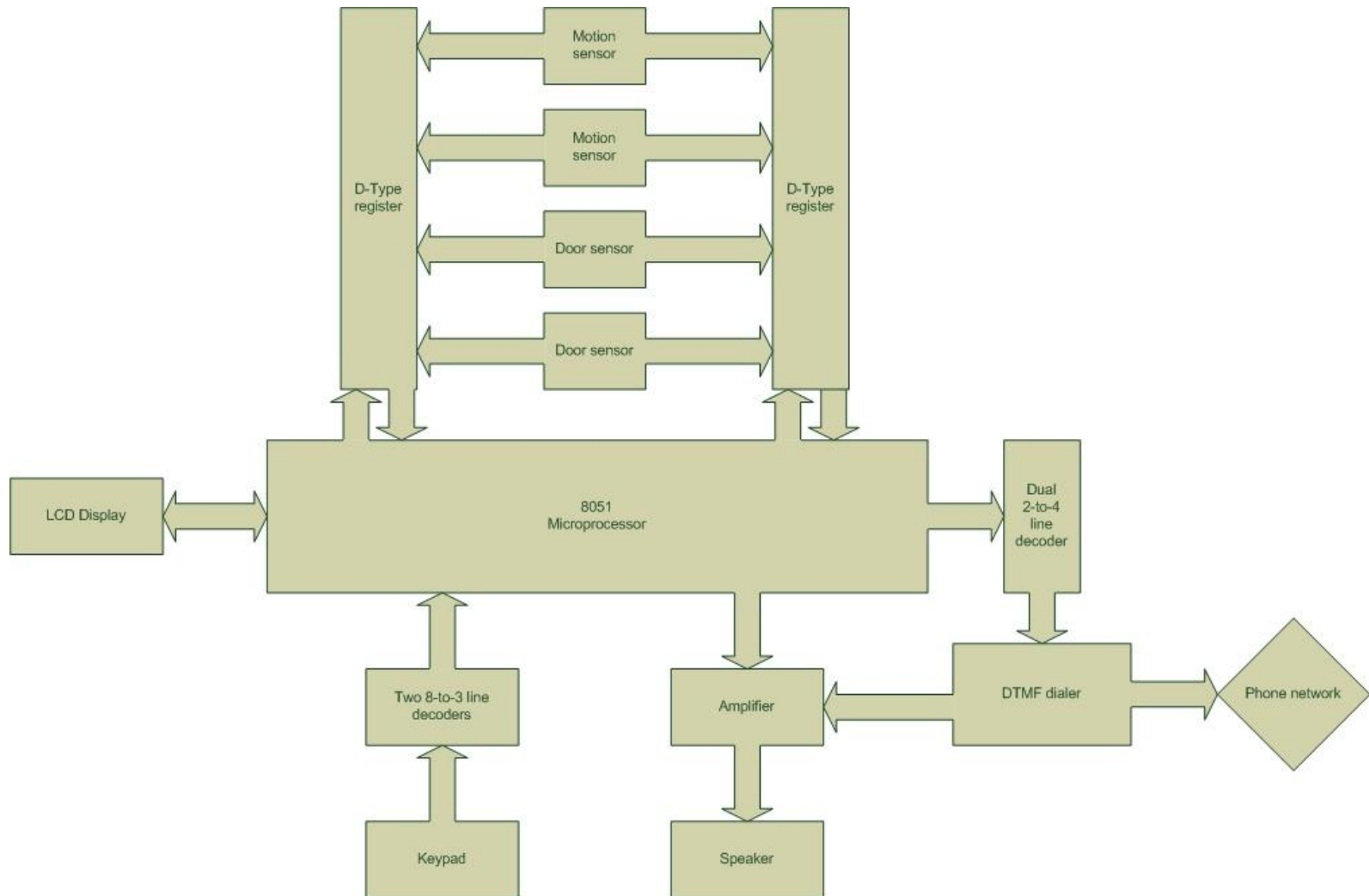
- ▶ Allow user to arm system
- ▶ Allow user to change password
- ▶ Allow user to change phone number
- ▶ Allow user to program modes (i.e. only door sensors active)
- ▶ Allow user to set delay on sensors individually

▶ Armed

- ▶ Allow user to disarm system
- ▶ Poll sensors continuously
- ▶ Sound alarm if sensors triggered
- ▶ Call stored phone number if sensor triggered



Operation of components



Problems

▶ Encountered problems

1. Shipping complications
2. Needed additional parts
3. Keypad was 12 pin instead of 8 pin matrix
4. Couldn't use 3-to-8 decoder

▶ Solutions

1. Reordered parts
2. Ordered additional parts
3. Multiplex keypad input
4. Use two 2-to-4 decoders



Problems cont.

▶ Potential upcoming problems

1. Connecting to phone network
2. How to power it
3. Voltage drop on sensor wiring

▶ Potential upcoming solutions

1. Use speakers and external phone
2. Use both batteries and AC power
3. Schmitt Trigger



Timeline

ID	Task Name	Start	Finish	Duration	% Complete	Jan 2008				Feb 2008				Mar 2008				Apr 2008			
						6/1	13/1	20/1	27/1	3/2	10/2	17/2	24/2	2/3	9/3	16/3	23/3	30/3	6/4	13/4	20/4
1	Programming	02/01/2008	15/04/2008	105d	0%																
2	Breadboard prototype	02/01/2008	31/01/2008	30d	0%																
3	PCB layout creation	11/02/2008	17/02/2008	7d	0%																
4	Create PCB - Mill Main board - Mill sensor boards	18/02/2008	29/02/2008	12d	0%																
5	Mid-term presentation preparation	25/02/2008	29/02/2008	5d	0%																
6	Assembly	01/03/2008	09/03/2008	9d	0%																
7	Troubleshooting	09/03/2008	08/04/2008	31d	0%																
8	Documentation	31/03/2008	11/04/2008	12d	0%																
9	Final presentation	12/04/2008	18/04/2008	7d	0%																

ID	Task Name	Start	Finish	Duration	% Complete	Jan 2008				Feb 2008				Mar 2008				Apr 2008			
						6/1	13/1	20/1	27/1	3/2	10/2	17/2	24/2	2/3	9/3	16/3	23/3	30/3	6/4	13/4	20/4
1	Programming	02/01/2008	15/04/2008	105d	0%																
2	Breadboard prototype	01/02/2008	09/03/2008	38d	0%																
3	PCB layout creation	07/03/2008	10/03/2008	4d	0%																
4	Create PCB - Mill Main board - Mill sensor boards	11/03/2008	20/03/2008	10d	0%																
5	Mid-term presentation preparation	25/02/2008	29/02/2008	5d	0%																
6	Assembly	20/03/2008	30/03/2008	11d	0%																
7	Troubleshooting	01/04/2008	12/04/2008	12d	0%																
8	Documentation	31/03/2008	11/04/2008	12d	0%																
9	Final presentation	12/04/2008	18/04/2008	7d	0%																



Meeting deadlines

- ▶ **Things that may be cut due to time constraints**
 1. Connecting to phone network
 2. User programmed modes
 3. Store password and phone number in Code segment (store in memory instead, no IAP)



Possible additions

- ▶ **Battery indicator**
 - ▶ Let users know if batteries are dead
- ▶ **Horn as audible alarm**
- ▶ **Flashing light as visible alarm**



Conclusion

- ▶ **Home alarm system to detect intruders**
 - ▶ Scare intruder away with audible alarm
 - ▶ Ability to call a phone number to notify others
- ▶ **Based on the 8051 chip**
- ▶ **Slightly behind schedule**
 - ▶ Work hard during spring break to catch up



Questions

