Software Engineering Workshop 2A
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Assignment 2
User Manual

Group COMP2121E2

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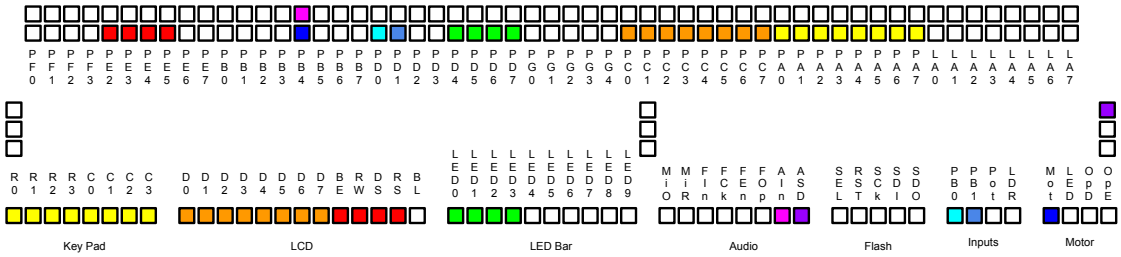
1 Introduction

This elevator control system is modelled through an ATMega64 AVR board. The board should be connected the following way



The following connections are to be made:

- PB4 ↔ Mot
- R0 - R3 ↔ PA0 - PA3
- C0 - C3 ↔ PA4 - PA7
- PC0 - PC3 ↔ D0 - D7
- PC4 - PC7 ↔ D4 - D7
- BE - RS↔ PE5 - PE2
- PB0 ↔ PD0
- PB1 ↔ PD1
- LED0 - LED3 ↔ PD4 - PD7
- AIn ↔ PB4
- ASD ↔ Speaker (PIN 1)

Note that PORTE is wired backwards so you will have to connect PE2 - RS, PE3 - DS, PE4 - RW, PE5 - BE. This elevator system is designed only for the interior buttons of an elevator. That is to say that in this system, you cannot request a floor outside the elevator. Instead you must do it from inside the elevator. Hence, the *idle* state of the elevator is to have to doors open. Alternatively, the system can be used for elevator attendants inside hotels where access is restricted and control over the lifts is only for staff members.

2 Details

2.1 Input

Use the keypad to request a floor. When you press a key, it will appear on the screen along with the next floors to visit. However, you cannot request a floor that you have already passed until there are no more floors to visit, nor can you request the floor that the elevator is currently on. For example, if I am on level 5 and the lift is heading up to level 6 and 8 next, then I cannot request any floors from 0 to 5. I can however request the floors 7 and 9 and they will be inserted in order. To keep it simple, we do not request level 7 or level 9. As a user, I cannot request floors 0 - 5 until I have visited floor 8.
Pressing the # key on the keypad forces the door to open if it is closing or closed and the elevator is not moving. If you keep the # key held down, the door will stay open and the elevator cannot leave the floor.

Pressing the PB0 push button forces the door to close. However, the only time this button is active is if the elevator is at a floor and is stationary. Note that if there is no floors that have been requested and PB0 is pushed, the doors will close and the elevator will not move until the a floor is requested. Also note that this button is disabled while the elevator door is opening and thus cannot override that sequence.
In case of emergencies, you can press the PB1 push button. Doing so will cause the elevator doors to close regardless of the state of the elevator and sends the elevator down to ground level. It displays the message "Emergency Call 000". When the elevator reaches the ground floor, the doors will open and stay open for a short time, and then the elevator doors will close and stay closed until the system is reset.

2.2 Motor Control

Motor control is quite simple in this system and is linked with the speaker system. When the elevator is stationary, the motor turns off and so does the speaker. When the door is closing, the motor will spin at 40 rps and a high pitch ding will play in the speaker. When the elevator is moving, the motor will spin at 20 rps and a very high pitch ding will play. When the door is opening, the motor will spin at 70 rps and a low pitch sound will be made by the speaker.

2.3 LED

The LED panels display the state of the elevator. There are 4 LED panels that can light and and I will label them as 0, 1, 2 and 3. When 0 is on, the elevator is stationary. When 1 is on, the doors are closing. When 2 is on, the elevator is moving. When 3 is on, the elevator doors are opening. Most of the time these LEDs will simply light up in sequence, but the open and close buttons can mess with the sequence a little bit. During an emergency, all 4 lights will flicker, although it may not look like it.