

Automotive Door Controls

CSE 470
Group: Doors

Fall 2001

1 Problem Description

Embedded systems in cars can offer considerable flexibility over standard electro-mechanical systems. One such embedded system is the controls that are located on the door consoles of each of the doors. This system includes the controls to roll the windows up and down, an automatic door lock mechanism, and the external mirror controls. The position of the mirrors can be saved in two memory locations. This system needs to be designed in such a way that it is easy to change for next year's model.

2 Constraints

- Door lock and unlock toggle:
This feature will be on both of the front doors, but not on the back doors (in the case of a 4-door car.) Back doors can be manually opened, even when they have been locked with this feature.
- The correct window button rolls the selected window down or up until button is no longer depressed.
- In the case of an up-down conflict between the driver's side button for a window, and that window's button, the window will not move, or cease motion when the conflict occurs and as long as the conflict continues.
- The torque produced by the motor can be sensed (as a function of motor current being drawn). The system must stop the motion of any "high torque" motor. This could indicate the window reaching it's up or down stop, or striking an obstacle.
- More than one window can be in motion at once.
- The driver's door will have more features and abilities than the other doors:
 - Window buttons controls for all doors will be on driver's side: One button for each rolling window in the car (4 for 4-door cars, 2 for vans or 2-door cars)

- Express roll down for driver-side window: holding the driver’s window down button for 1 second will cause the window to continue to the fully down position even if the button is released.
- Engaging the down button again during express down will stop the window.
- Both driver’s side and passenger’s side mirrors can be controlled by a four way switch (up, down, left right). A three position switch determines whether the driver’s side mirror, or the passenger’s side mirror is being moved. The middle position disables the mirror positioning switch.
- Pressing the “set” button, followed by either the “1” button or the “2” button saves the current position of the mirrors in either memory 1 or memory 2, respectively.
- Pressing “1” or “2” alone positions the mirrors to the saved position.
- While the mirror select switch is in the passenger’s side position, and the car is placed in reverse, the passenger’s side mirror will tilt fully down.
- The “window lock” switch will inhibit all window control buttons, except the driver’s side, while enabled.

3 Assignment

Your group is to do the following tasks:

1. Schedule a meeting with your customer.
2. Prepare a detailed agenda for this meeting that addresses specific questions about the requirements for the project
3. Conduct the meeting and take specific minutes recording the issues raised and any resolution of those issues
4. Write a revised problem description statement that elaborates on the details of the problem to be solved
5. Write the requirements analysis document