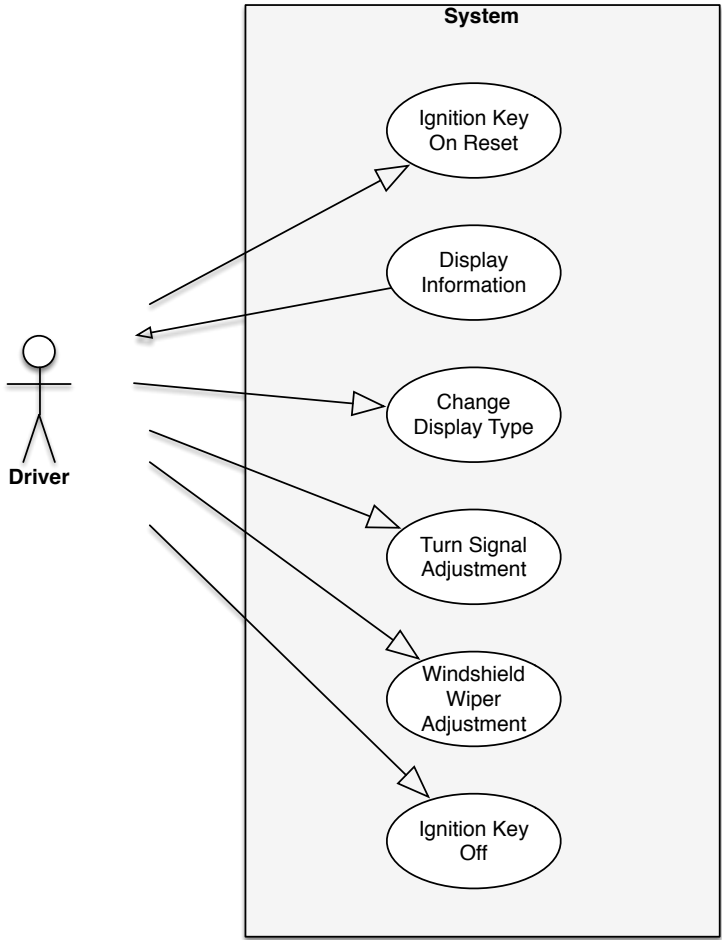
SYSTEM DESCRIPTION

The system is a dashboard information kiosk for an automobile. The information kiosk is mounted in front of the driver steering column and visible to the driver through the steering wheel. This system is one of many information kiosks that make up the set of informational dashboard electronics. This system presents selected information based on a user selection made from a steering column control switch.

REQUIREMENTS

1. The system must display a welcome message when the ignition key is turned on.
2. The system must play welcome music when the ignition key is turned on.
3. The system must respond to user information selection requests.
4. The system must display the status of the fuel tank fuel level.
5. The system must display the status of the gear shift selection.
6. The system must display the status of the turn signals.
7. The system must display the status of the starter battery voltage.
8. The system must display the status of the passenger doors.
9. The system must display the status of the front passenger seat belts.
10. The system must display the engine revolutions-per-minute (RPM).
11. The system must display the speed in miles-per-hour (MPH).
12. The system must display the speed in kilometers-per-hour (KPH).
13. The system must generate turn signal lighting based on user selection.
14. The system must control windshield wiper speed based on user selection.
15. The system must monitor for and report imminent forward collision conditions.
16. The system must operate from standard U.S. line power or USB supplied power.
17. The system does not need power-failure or system failure recovery.

USE CASE DIAGRAM



USE CASE EVENTS

1. Ignition Key On Reset

    A. The driver turns on the ignition key.
    B. The system initializes to a default display mode.
    C. The system displays a welcome message.
    D. The system plays a 2 seconds of startup music.
    C. The begins monitoring user inputs.
    D. The system begins displaying status outputs.

2. Display Information

    A. The system displays the currently selected information.
    B. The system responds to measured value changes with display updates.

3. Change Display Type

   A. The driver selects a different display using a steering column push button.
   B. The system advances to the next informational display.

4. Turn Signal Adjustment

   A. The driver selects left turn, right turn, or hazard signals.
   B. The system generates a minimum of three flashes.
   C. The system generates flashes until no longer selected.
   D. The system flashes indicators at one flash per second.
   E. The system toggles on-off at one-half second rate.

5. Windshield Wiper Adjustment

   A. The driver selects a windshield wiper speed rate.
   B. The system generates pulses to control the wiper motors.
   C. The system generates pulses until no longer selected.

6. Ignition Key Off

   A. The driver turns off the ignition key.
   B. The system blanks the information display.

SPECIFICATION OF SYSTEM INPUTS AND OUTPUTS

1. System Inputs

   The system is implemented on a CE2811 DE0 computer board.

   A. The system uses slider SW9 for ignition key on-off selection.
   B. The system uses pushbutton PB2 for display type selection.
   C. The system uses slider set SW[1:0] for turn signal selection.
   D. The system uses slider set SW[6:4] for windshield wiper speed selection.
   E. The system uses analog channel 0 to measure engine RPM.
   F. The system uses analog channel 1 to measure vehicle MPH.
   G. The system uses analog channel 2 to measure collision distance.

2. System Outputs

   The system is implemented on a CE2811 DE0 computer board.

   A. The system generates sound on the speaker.
   B. The system generates displays on the LCD panel.
   C. The system generates turn signals on LEDG[6:5].
   D. The system generates windshield wiper motor pulses on J4[1:0].