Blind Spot Monitor

Tim Salanta, Tejas Sevak, Brent Stelzer, Shaun Tobiczyk
Why design a blind spot monitor?

- A Blind spot is defined as the area a driver cannot see while driving and using their mirrors.

- The National Highway Traffic Safety Administration reports 300 fatalities and 18,000 injuries occur yearly in the United States due to blind spots.¹

- Regardless of mirror positions, blind spots still exists in the side and rear of vehicle

- Blind spot monitors exist in newer vehicles but they are costly

¹http://www.fortheinjured.com/blind-spot-accident.html
Why design a blind spot monitor?

- Design a system that could be added to just about any car affordably
- It helps “eliminate” blind spots
- Could also be added to the front and rear of the car (parking and reversing)
Sonar Sensor

- Distance measuring sensor
- 15 ft. dowel
- Detects objects
- Requires 5 volts to run properly
- 15 degree sensing angle
- Electric frequency output ranging from 5V (on), 0V (off).
- Simulation of car mirrors, two sensors to detect blind spot on each side of vehicle
Sonar Sensor

Formula used in calculating the distance from the sensor:

\[ \text{uS} / 58 = \text{centimeters} \]
\[ \text{uS} / 148 = \text{inch} \]

Calculating the range:

\[ \text{range} = \text{high level time} \times \text{velocity} \]
\[ (340\text{M/S}) / 2 \]
Sonar Sensor

Timing Diagram

Trigger Input to Module

10μs TTL

Timing Diagram

3 Cycle Sonic Burst

Sonic Burst from Module

Echo Pulse Output to User Timing Circuit

Input TTL lever signal with a range in proportion
Top Level
Waveform
Initial Ideas

- Using different sensors.
- Lidar, infrared
- Different project, such as line following robot
- Scaled the project from car size to smaller scale.
Problems Faced

- Using 3.3V caused issues with the sonar sensor.
- 5V fixed the issue.
- Having multiple parts for testing purposes
- Obtaining parts on time
Improvements

- Display distance to object
- Output audio feedback for the driver
- Add another sensor in the front and rear of vehicle
- Make it life scale (to fit in car)
- More accurate sensors
- 3.3V sensor to work on the same supply