Speed trap

Introduction

This project form part of a larger group project, with the ultimate aim of creating a self-driving car.
My part of this project is to create a speed trap system to ensure all road users that the automated cars travelling on the roads are within speed limits

Initial project specification

Display to drivers their speed.

Using a:
- Speed sensor.
- A conversion module.
- + LARGE DISPLAY

Design Goal

Utilising the knowledge that I have gained on the HND course so far my goal is to create a laser or ultrasound device that will safely display the speed of oncoming vehicles.

Rational for selection

Autonomous driving capability could change the automotive industry in fundamental ways semi-autonomous driving technology can be adopted for faster delivery of cargo through automation of trucks.
We can retrospectively introduce some form of semi-autonomous driving to older vehicles and increase the market need.

Feasibility

Parts are available cheaply and many similar project have already been attempted for stand alone applications, I intend to mount mine on a sign.

Initial critical analysis

Many different sensors – list them ultrasound, laser – 40m? < only 7m

Which is best

Different processors, list them (ARM, 8051, PIC, Arduino) choose arduino

Parts list for LIDAR Speed trap

WifiBoard
https://www.rapidonline.com/arduino-uno-wifi-atmega328-with-integrated-esp8266-wifi-module-564638

LIDAR-Lite Laser Rangefinder
http://www.robotshop.com/uk/lidar-lite-3-laser-rangefinder.html

7 segment display driver
http://www.robotshop.com/uk/sparkfun-large-digit-driver.html

7 segment display
http://www.robotshop.com/uk/sfe-7-segment-red-display.html x 2

https://github.com/sparkfun/Speed_Trap

Final Project Report Format (assignment 2)

1. Title Page
   Give the project title (not longer than 15 words), your name, course, and date of submission.

2. Acknowledgements Page
   Short acknowledgement of people who helped you. (Optional)

3. Contents Page
   Give page numbers and section headings.

4. Introduction
   This 'sets the scene' and gives the reader a background to your project describing what is being done and why. Give references for the literature you cite. It may help you to answer questions like: What does the circuit do? How does it do this? What else like this is available? Where can it be used? What else like this is being used? What is different about what I am doing? Is it an improvement over what is available (e.g. more useful, simpler, cheaper, etc)? Do not give circuit diagrams or details of circuit operation in this section. This is done in section 6. This section and the references to published work should bring the reader to the point where he/she is in a position to read and understand your report in detail. A short, example Introduction is given below. Your Introduction is expected to be more detailed and longer.

5. Aim, Objectives and Deliverables
   (refer back assignment1)

   Aim

   Give the main aim of your project. This is what you hope to achieve by the end of the project. **There should be only one Aim for the entire project**. Try to make this as specific as possible so that you and others can assess how successful you have been at the end of the project. 15

   Objectives

   These are subsidiary aims whose completion will enable the main aim to be met. There can be several of these. You should not have more than 6-7 objectives. List the objectives.

   Deliverables

   Deliverables are the main outputs of the project i.e. what will be available at the end of the project e.g. the final report, the project hardware itself, any manuals etc. Deliverables are obviously related to the aim/objectives. List the deliverables.

6. Technical Background
   For your chosen project, give block and circuit diagrams which you took from the literature, internet, etc. Describe in detail how the circuit works (circuit operation, theory, etc). If you changed/modified/enhanced the circuit in any way, give details of the changes to the circuit and their effect on its operation. Give the complete functional a[redacted]ect. All

the sources of information must be fully referenced.

7. Technical Approach/Procedure (LO2.2, LO4.1)
This is the 'how you did it' or 'method' part of the report. Describe in detail the work carried out on designing, building and testing the project. This should cover circuit layout design, design of the overall project including the case, procedure used for simulating the circuit, procedure for building and procedure for testing. You can often do things in more than one way and you may have tried different approaches – describe these. You should also describe the technical problems you encountered and your attempts to solve them. Organize this section using different sub-headings as appropriate for your work.

8. Results (LO2.3, LO3.2)
In this section you need to present your main results from performance testing. If the data you give is quantitative, present it carefully using diagrams, tables and graphs as appropriate. If it is qualitative describe it in the context of the test/evaluation procedure used. An analysis of outcomes against the initial specification should be included here.

9. Discussion (LO2.3, LO3.1))
Describe how the results of testing have compared with any simulation results. State how significant you think the work is and support your claims with evidence from your results, the literature, etc.

10. Conclusions and Recommendations for Further Work (LO2.3) (LO3.3)
Summarize your key findings and results, successes and failures and problems encountered. Assess the work against the aims and objectives listed at the beginning of the report and the deliverables. Have you met these? Finish off with recommendations for further work that needs to be done or could be done to enhance the project. The use of bullet points is a very effective way of listing the conclusions and is recommended.

11. References
Give a complete list of books, magazine articles, web sites, etc. that you have consulted and referenced in the report. References are essential. You must give the complete details for every work and use a consistent format as described in the example Introduction below or in the Study Skills Survival Guide.

12. Project Planning LO2.1
A key aim of planning your project is to ensure it can be completed in the time allocated. The subject was discussed in detail in the project lectures. You must give an Action plan and Gantt chart covering the period from the start of your project to its conclusion. Review your chart regularly. You will need to re-plan as the project progresses to take account of changes. In your final report you should show the initial Action Plan and Gantt chart drawn, a revised Gantt chart drawn half and a final end of project Gantt chart. You must also give a list of the main milestones for the project. Milestones are used to measure progress and generally coincide with main events during the project. An

example of a milestone is "design of amplifier completed by end February 2017". Think of the key events for your project and their endpoints to come up with a few key milestones. Milestones can be shown on the Gantt chart or listed separately.

13. Appendices
An appendix is really optional reading for the reader but which you wish to include in the report for completeness. Only include items that are referred to in the report. Do not include published work - this should just be listed in the references. Inserts such as floppy disks must be securely attached to the inside-back cover of the report; they must be easily accessible and replaceable

Datasheet for Lidar V3

Datasheet for Atmel 328p

Large 7 seg display

SPEED TRAP

Introduction

Part of Automated vehicles project. Group
This isn't in the car. It monitors speed
out side, to measure the cars.

Basic ideas

3 ideas from Unit 8 assignment 2
1st idea - Ultrasound
2nd idea - Laser
3rd idea - microwave

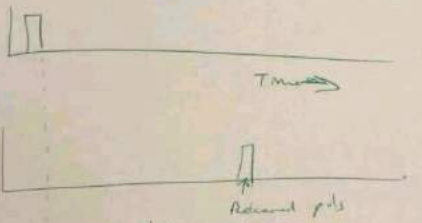
Chose laser - cheap & long distance

How does it work?

Invented by Bryce K Brown 1956
used for law

Microwave uses Doppler, this uses time pulse shift.

Laser pulse

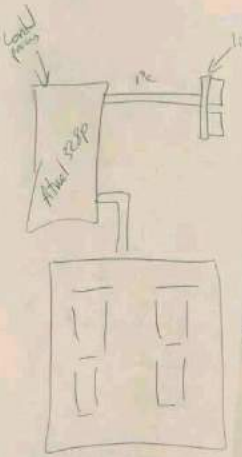


$S = \frac{D}{T}$

$D = \frac{S \times T}{2}$

speed of light

Block diagram



Measures distance, when distance changes, measures time taken to move

$S = \frac{D}{T}$ multiply S by a number to get mph