

# Laboratory 4: A Capacitance Meter Using the 555 Timer and C Programming

## Your Name

Partner: Partner's Name  
ECE 3534  
Electrical and Computer Engineering  
Virginia Tech

Date of Submission

Instructor: Name of Your Instructor  
Course Day and Time

## Summary

In the space provided on this page, write a summary of your work on this lab. The summary should be no longer than 200 words. Be sure to orient the audience as to what the overall subject of this report is. Then state the objectives for the two main sections of the assignment. Finally, inform the reader whether you achieved those objectives.

Note that you will have repetition between what you write here and what you write in the main text of the report. That repetition is not a weakness. People remember only about 20 percent of what they read; therefore, having repetition of key details at different places in a report helps ensure that the audience remembers those details. Given that the one or two paragraphs on this page will summarize what is written in the text of the report, we recommend that you write this section after you have written the main text of the report. Indent all paragraphs. Also, do not skip a line between paragraphs. In addition, do not allow this summary to go more than the length of this page. Finally, be sure to replace all blue type with your own words in black type.

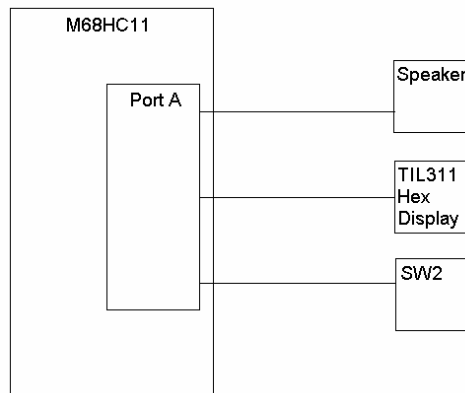
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## Introduction

This report presents.... Write an initial paragraph that introduces the scope of the report and makes an argument that this work is worth doing. As evidence for the assertion that the work is important, include an example application, make a reference to an assertion made in a publication [Author, Year], or do both. Be sure to replace all blue type with your own words in black type.

The hardware for the laboratory consisted of ....Formally introduce Figure 1 in this paragraph. Note that Figure 1 gives a general block diagram of the main components of the laboratory design. In Appendix A, you will include a much more detailed schematic. Finally, be sure to replace all blue type with your own words in black type.



**Figure 1.** Illustration title, which should be written as a phrase. Note that you might add a sentence to explain unusual details in the figure. Finally, note that this figure is just a sample illustration and is not the illustration that you will show.

This laboratory assignment consisted of two designs. The objective of the first design was to.... In a sentence or two, elaborate on the objectives of this design. The objective of the second design was to...In a sentence or two, elaborate on the objectives of the second design. Finally, be sure to replace all blue type with your own words in black type.

This report presents the procedures for achieving these two designs and assessments of how well the designs worked. Also included in the report is a detailed hardware schematic (Appendix A), pseudocode for the programs (shown in Appendix B), and the listing files for the programs (shown in Appendix C).

## Section 1: Design and Implementation of Timer Circuits

This section presents the first experiment of the project: list the main steps of this section of the design in a parallel fashion. Continue this paragraph by including necessary

background information. Where appropriate, refer to the laboratory specifications [Trisiripisal, 2006]. When referring to this section of the report, call it Section 1 or the first section. Be sure to replace all blue type with your own words in black type.

In three or four paragraphs, describe the design of the program. As needed, refer to the detailed hardware schematic that appears in Appendix A, the corresponding pseudocode or flowcharts that appear in Appendix B, and the corresponding assembled code that appears in Appendix C. Please do not create any subheadings in this section. Although using frequent headings and subheadings is often useful in instructions, having too many divisions breaks up the continuity of a completion report such as what you are writing here. Having just the two given levels of headings serves this occasion and length. Instead of using subheadings to show the organization of this subsection, use paragraphing to show the arrangement of details.

Notice that, in our format, no line skips occur between paragraphs within a section. Finally, be sure to replace all blue type with your own words in black type.

## **Section 2: Capacitance Meter**

This section presents... In five paragraphs or so, describe the work done in this section. Use paragraphs to reveal the organization of this section. Where appropriate, refer to the laboratory specifications [Trisiripisal, 2006]. When referring to this section of the report, call it Section 2 or the second section. Be sure to replace all blue type with your own words in black type.

As needed, refer to the detailed hardware schematic that appears in Figure A-1, the corresponding pseudocode or flowcharts that appear in Appendix B, and the corresponding assembled code that appears in Appendix C. Note that Figure A-1 would be the first figure in Appendix A. Likewise, Figure B-3 would be the third figure in Appendix B. Again, technical readers understand this convention and do not need a direction such as “in Appendix B” to tell them where Figure B-1 is.

Please do not create any subheadings in this section. Notice that, in our format, no line skips occur between paragraphs within a section. Finally, be sure to replace all blue type with your own words in black type.

## **Conclusions**

This report has discussed... In one paragraph, discuss how well the objectives mentioned in the Introduction were met. Discuss the significance of this laboratory in regard to the capabilities of the HC11 microcontroller. Note that the text portion of this report (Introduction through the Conclusions) should not be longer than 5 pages and no fewer than 4 pages (that length includes illustrations, but does not include the appendices or the front matter (title page and contents page)). If the text portion of the report goes a

little more than 5 pages (in other words, spills onto page 8), do not worry about it. The length of 5 pages for the text portion of the report is a target rather than a requirement.

## Appendix A: Detailed Hardware Schematic

**Figure A-1.** Hardware schematic used in this laboratory for (finish the phrase). This schematic should show the pin connections of your project. Consider using a software program such as AUTOCAD or VISIO to create this schematic. If you have unusual details in the schematic, add a sentence to the caption to explain those details.

## **Appendix B: Pseudocode**

### **Pseudocode for Section 1**

Pseudocode for the first program of Section 1 would begin here.

### **Pseudocode for Section 2**

Pseudocode for the second program of Section 2 would begin here.

## **Appendix C: Assembled Codes**

### **Assembled Code for Section 1**

Assembled code for the program of Section 1 would begin here. The assembled code is the same as the program listing. Make use of courier or a similar font and tabs to display the code correctly.

### **Assembled Code for Section 2**

Assembled code for the second program of Section 2 would begin here.

## References

Trisiripisal, Phichet, "Laboratory Assignment 4: A Capacitance Meter Using the 555 Timer and C Programming," <http://www.ece.vt.edu/cel/>, ECE 3534 (Blacksburg, VA: ECE Department, Virginia Tech, 2006).

Refer to additional sources as needed in an alphabetical list.