



Department of Electrical and Computing Engineering

UNIVERSITY OF CONNECTICUT

ECE 3411 Microprocessor Application Lab: Fall 2015

Question II

There are 2 short questions in this quiz. There are 2 pages in this quiz booklet. Answer each question according to the instructions given.

You have **5 minutes** to answer the questions.

If you find a question ambiguous, be sure to write down any assumptions you make.

Be neat and legible. If we can't understand your answer, we can't give you credit!

Write your name in the space below. Write your initials at the bottom of each page.

**THIS IS A CLOSED BOOK, CLOSED NOTES QUIZ.
PLEASE TURN YOUR NETWORK DEVICES OFF.**

Any form of communication with other students is considered cheating and will merit an F as final grade in the course.

Do not write in the box below

Total (xx/10)

Name:

Student ID:

1. Software based debouncing performs *Read-Wait-Verify* sequence on the digital input signal to filter out the glitches. The figure below shows a push-switch circuit and the signal generated by it (i.e. the voltage at node 'To AVR') while going from 'Pushed' (Low) state to 'Released' (High) state. Each division on the horizontal axis of the graph represents $100\mu s$. What should be the minimum wait time for the *Read-Wait-Verify* sequence in order to filter out all the glitches shown in the graph? Please round your answer to the closest multiple of $100\mu s$.

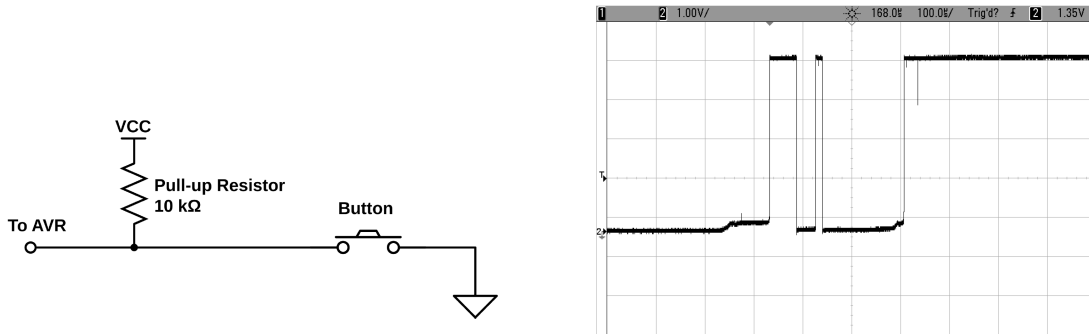


Figure 1: A push switch circuit and its generated signal.

2. The push switch circuit from the previous problem has been slightly modified as shown in the figure below. Please draw the waveform of the signal generated by this switch (i.e. the voltage at node 'To AVR') when the switch transitions from 'Pushed' state to 'Released' state. Compare this waveform with the one in the previous question and explain the difference between the two.

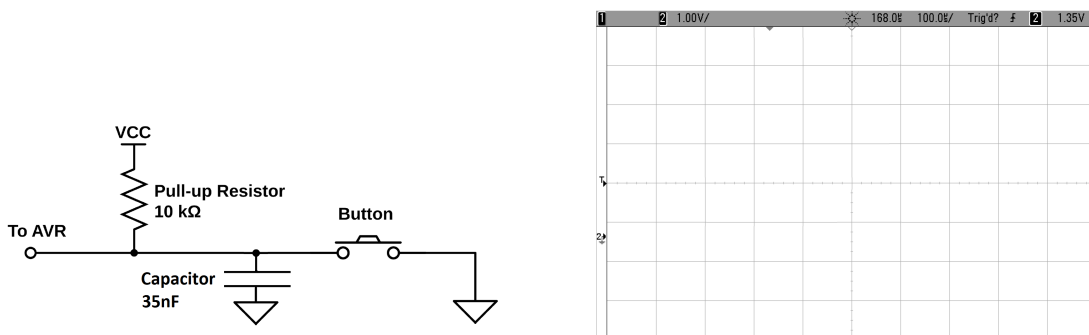


Figure 2: A modified push switch circuit.

End of Question

Please double check that you wrote your name on the front of the question.

Initials: