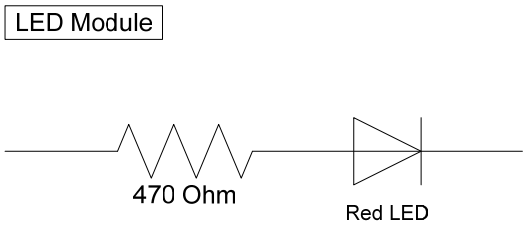
Dan Wilcox 2-28-2006 Art and Tech

Narrativity and Interactivity 5 p - experimental assignment 3

Carry out all these experiments in groups. All group members must participate in and understand all experiments. Write down the results (with attention to detail) in a brief written report, to be handed in no later than Monday, March 6th.

1. Soldering Exercise: This is to be done individually during class. You will be given the materials to construct an LED module on a small piece of prototyping board for use in later labs. These components must be soldered together correctly and under my supervision before class ends on Wednesday. Circuit:



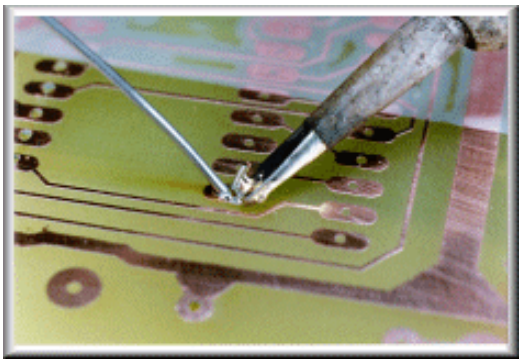


Figure 1 Good Soldering (http://www.epemag.wimborne.co.uk/solderpix.htm)

Figure 2 Bad Soldering (http://www.epemag.wimborne.co.uk/desolderpix.htm)

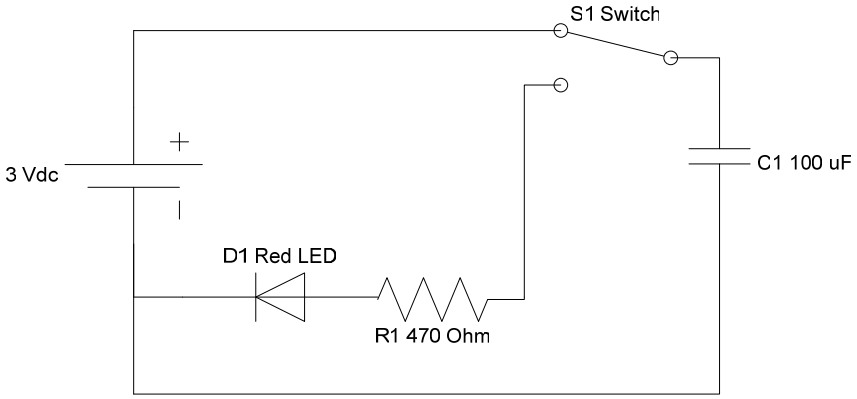
2. Capacitor Circuit A:

a. study the circuit schematic:

- Is the LED on when S1 is up?
- What is the capacitor doing when S1 is flipped up?
- What will happen when S1 is flipped down?
- Draw 2 graphs of what you think the voltage across capacitor C1 will do over time: when S1 is connected to up / when it is down

b. Construct the circuit on a breadboard (use your new LED module, if ready).
c. S1 can just be a wire you move from one point to another, try “flipping this switch” for different time intervals and record what happens.
d. Repeat the last step using an oscilloscope to measure the voltage across C1. Draw a graph indicating what happens to this voltage when S1 is changed to different positions. (Note: You want a slow sweep speed around 1s in order to see the change clearly).
e. Compare your results with your initial hypothesis from part a and explain any differences.
f. Draw and label your correct and working circuit on the breadboard picture.

Circuit A Schematic



Circuit A Breadboard

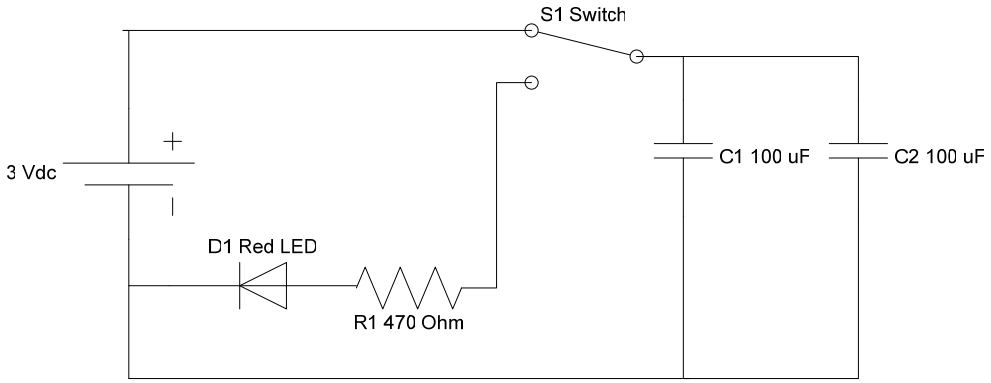
3. Capacitors in Parallel, Circuit B:

a. Study the circuit schematic:

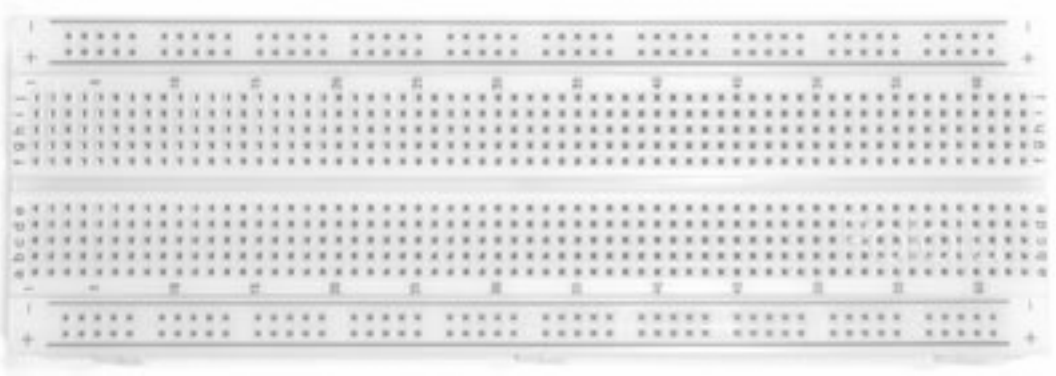
   - Will the LED stay on longer or shorter than in Circuit A?
   - Will the LED be brighter or dimmer than in Circuit A?
   - Will you burn your LED?

b. Draw 2 graphs of what you think the voltage across capacitor C1 will do over time: when S1 is connected to up / when it is down.
c. Construct the circuit on a breadboard (use your new LED module, if ready).
d. S1 can just be a wire you move from one point to another, try “flipping this switch” and record what happens.
e. Repeat the last step using an oscilloscope to measure the voltage across C1. Draw a graph indicating both the voltage value and what happens to this voltage when S1 is changed to different positions. (Note: You want a slow sweep speed around 1s in order to see the change clearly).
f. Compare your results with your initial hypothesis from part a and explain any differences.
g. Draw and label your correct and working circuit on the breadboard picture.

Circuit B Schematic



Circuit B Breadboard



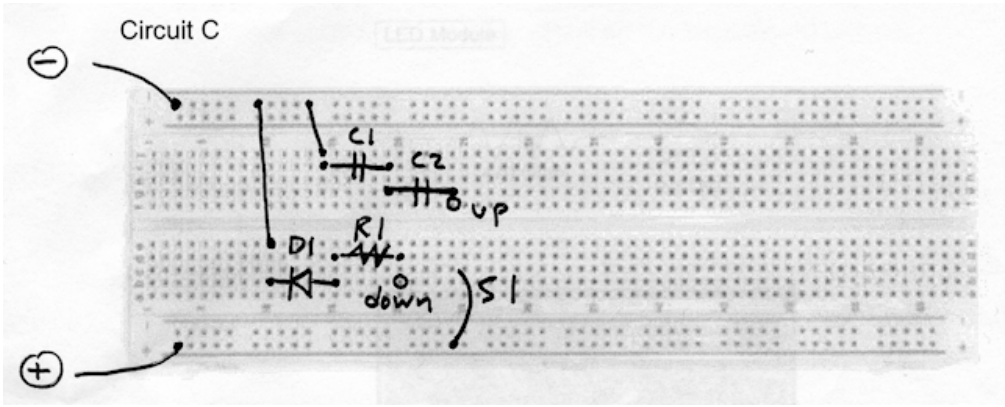
4. Capacitors in Series, Circuit B:

a. Study the circuit schematic:

   - Will the LED stay on longer or shorter than in both Circuits A and B?
   - Will the LED be brighter or dimmer than in both Circuits A and B?
   - Will you burn your LED?

b. Draw 2 graphs of what you think the voltage across capacitor C1 will do over time: when S1 is connected to up / when it is down.
c. Construct the circuit on a breadboard (use your new LED module, if ready).
d. S1 can just be a wire you move from one point to another, try “flipping this switch” for different time intervals and record what happens.
e. Repeat the last step using an oscilloscope to measure the voltage across C1. Draw a graph indicating both the voltage value and what happens to this voltage when S1 is changed to different positions. (Note: You want a slow sweep speed around 1s in order to see the change clearly).
f. Compare your results with your initial hypothesis from part a and explain any differences.
g. Draw your correct and working circuit as a schematic in the space provided (I used the MS Visio electrical engineering symbols).

Circuit C



Circuit C Schematic