

Supplement to the Traditional Lab Manual for Experiment #1

Hands-On Version of Experiment #1 Only!

Sections 1 and 2 – read these in their entirety.

Section 3 – Prelab Exercises

- 3.1 Delete.
- 3.2 Change R to $1\text{M}\Omega$ and C to $100\mu\text{F}$.
- 3.3 Delete.
- 3.4 No changes.

Section 4 – Experiments

The equipment for our hands-on experiment is completely different. It includes

Instrustar USB Oscilloscope/Function generator Model 205B

XL830L DMM

Power Supply: 9V Rectangular Battery

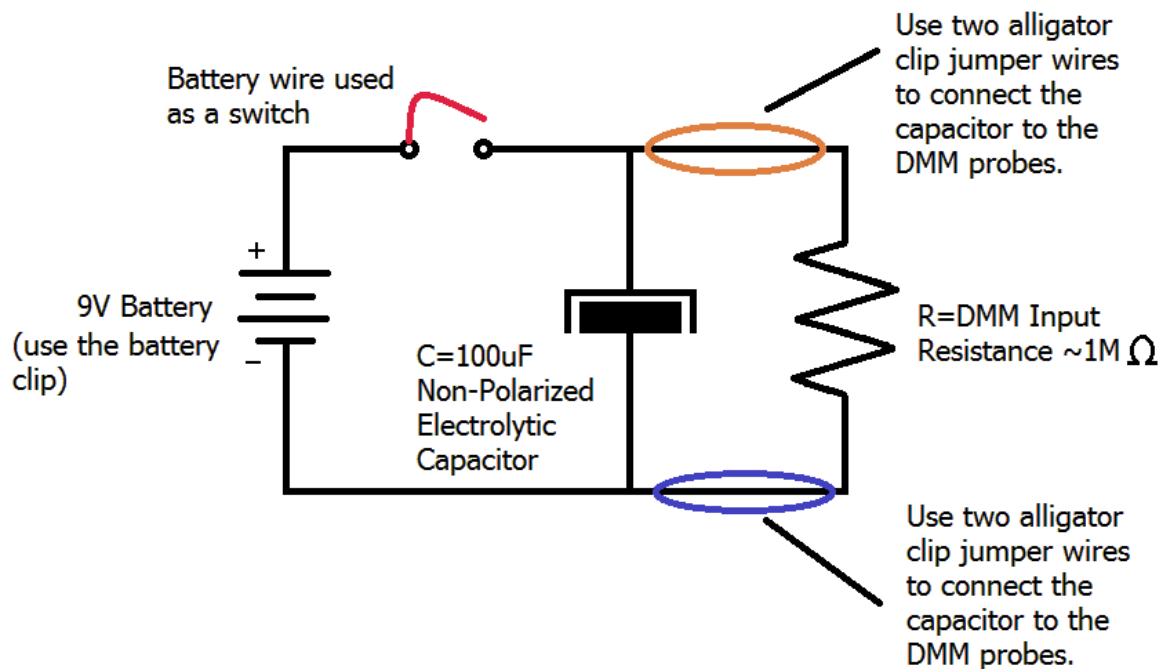
Stopwatch or Cellphone App

Resistors

Capacitors

Camera/Copy Screen Command to Record Waveforms

- 4.1 Change the schematic of Fig. 5 to



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4.1 Continued

The new value of $C=100\ \mu\text{F}$ and the new $R=1\text{M}\Omega$. Set the DMM to the 20 Volt DC scale and measure the 9V battery (you should get 8.8V-9.7V). This is your source voltage. Also, you can delete the first two of the three notes. The rest of the task is unchanged but note that there is an error in Table #1. The 45 second row is missing. It's easier to record your data to a spreadsheet so you can make calculations and plots later.

4.2 Square Wave Response

- a. No Changes.
- b. Change the 4th sentence to "...set the function generator amplitude to 5V peak to peak, 0 volt offset."

Also, during this experiment, you should use to vertical sensitivity and horizontal timebase specified in the traditional lab manual as a guide but you can be flexible with your settings for both.

- c. No Changes.
- d. No Changes.
- e. Note that the internal source resistance of the USB oscilloscope's function generator (DDS) is approximately 200Ω so the effect will be more pronounced.
- f. Set the amplitude to 5V peak to peak.

Delete the note at the bottom of the page.

4.3 Integration and Differentiation

4.3.1 No Changes

4.3.2 Change the function generator output to 5V peak to peak.

Note, be careful of the DC offset voltage when you are doing the integrations. Once you have minimized the offset voltage as best as you can you should change the coupling for Channel #2 to "AC". Switch it back to "DC" when you begin the differentiations.

4.3.3 Delete the 2nd sentence.

4.3.4 No Changes.

4.3.5 No Changes.

4.3.6 Change the input voltage to 5V peak to peak.

Section 5 - Report

5.1(a) No Changes.

5.1(b) I recommend using a computer plotting program rather than doing your plots on graph paper.

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5.2 to 5.9	No Changes.
5.10	Delete.
5.11	Delete.

Note: I have included some high resolution photos of the connections on Canvas for this experiment. But the parts and the protoboard that I have aren't quite the same as supplied in the lab kits.