

EECE 2150 - Circuits and Signals: Biomedical Applications

Lab 1

Getting started with protoboards

Part 1. From Circuit Diagrams to Protoboards

Following the exercises performed in class, translate the following two example circuits to the protoboard worksheets on the next two pages.

Note:

- 1) **Do not build these circuits!** For now we are just practicing taking a circuit and thinking about how to build it on a protoboard.
- 2) We have not learned how to analyze these circuits yet. This is fine!

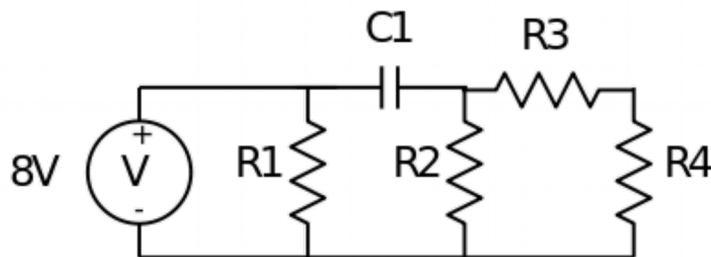


Figure 1. Example Circuit #1.

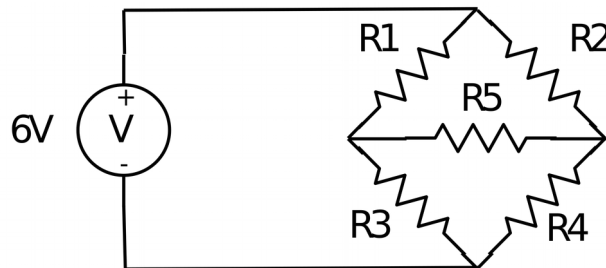
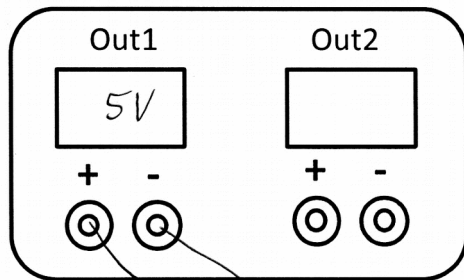


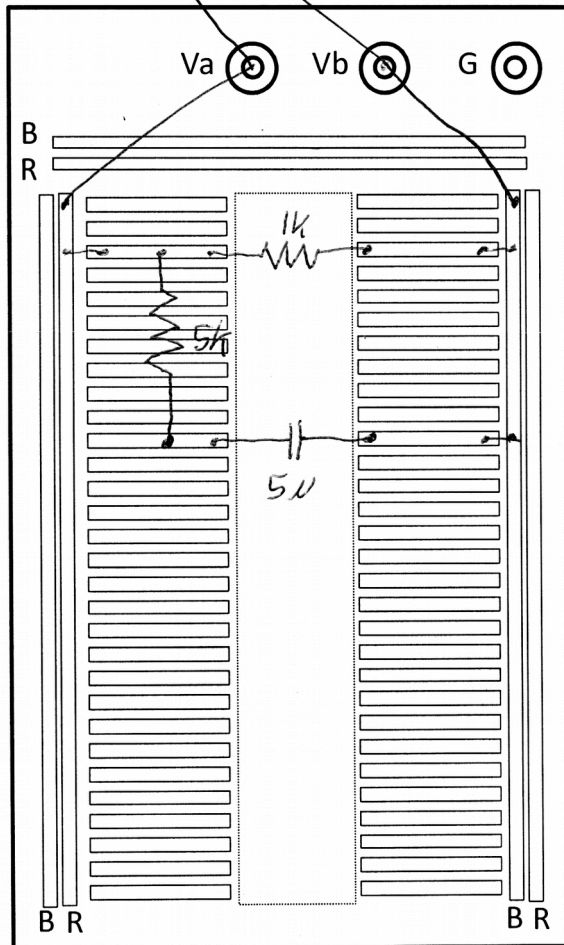
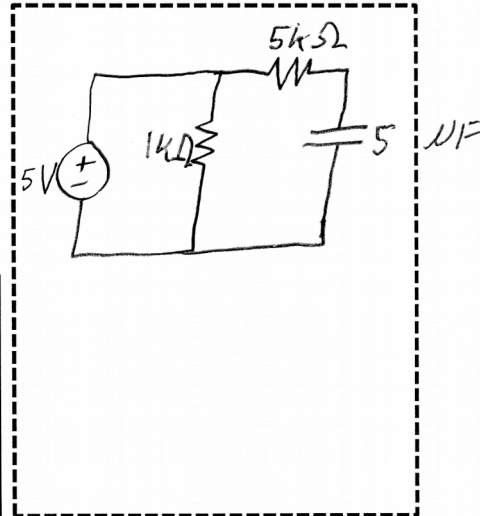
Figure 2. Example Circuit #2

Example: Note that the positive supply wire is typically red, and the negative supply is typically black, green, or blue. It is good practice to try to use the color coding on the proto-board when possible. The binding posts (Va and Vb here) are used to transition from the banana-plug leads that go from the supply to the board to wires on the protoboard.

Power Supply

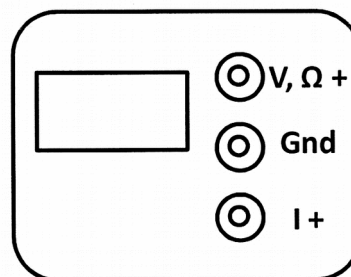


Circuit Diagram



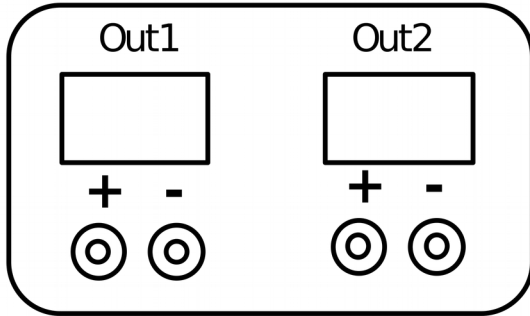
Breadboard

Multi-meter

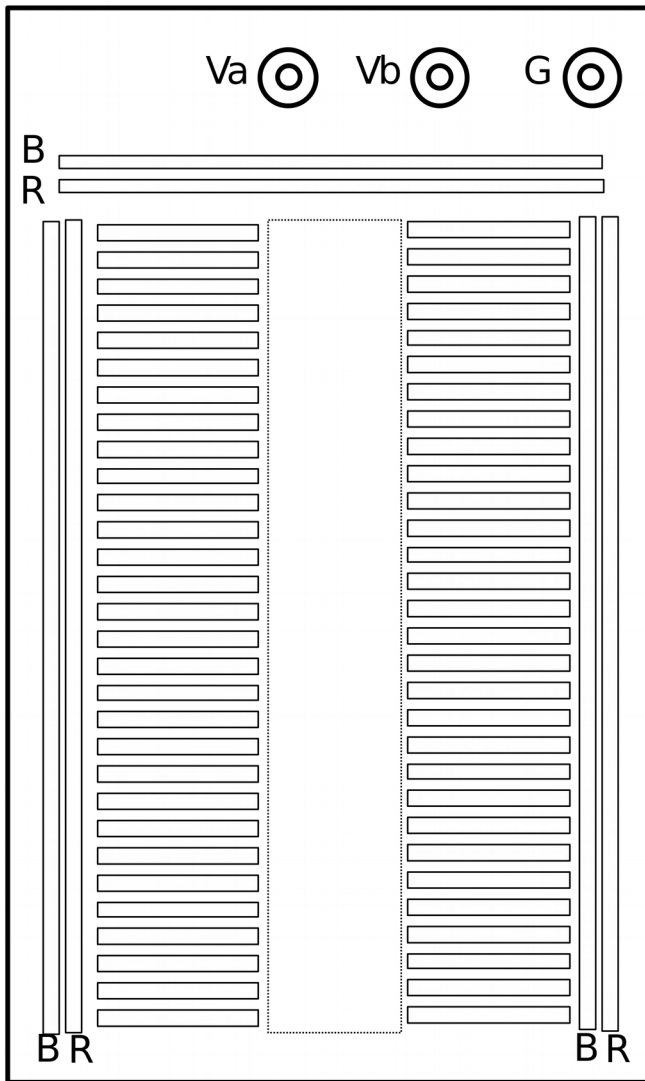


Proto-board Worksheet for Circuit #1

Power Supply

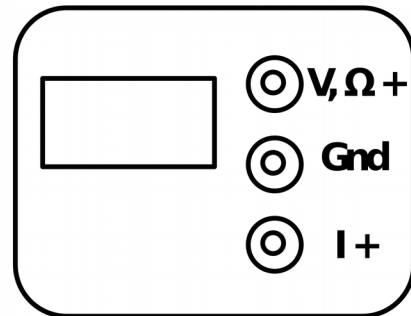


Circuit Diagram



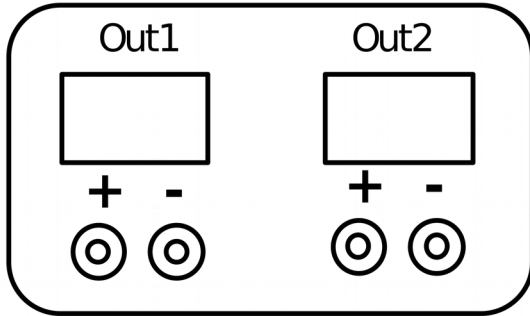
Breadboard

Multi-meter

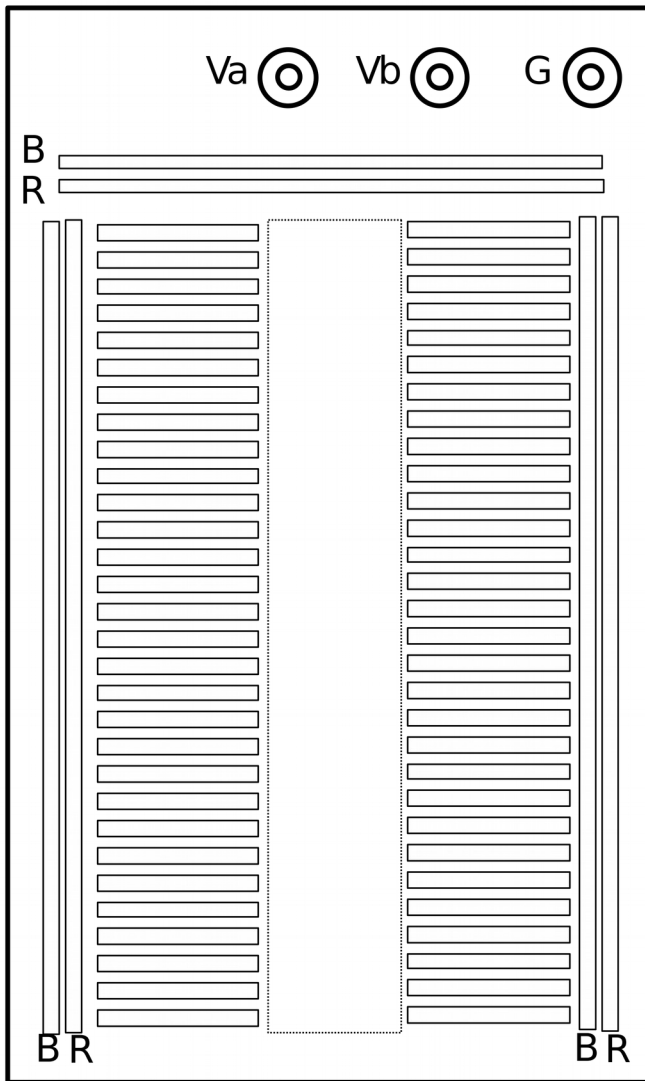


Proto-board Worksheet for Circuit #2

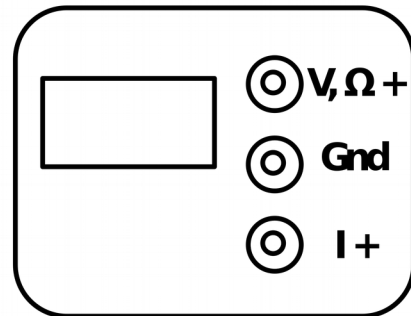
Power Supply



Circuit Diagram



Multi-meter



Breadboard

Part 2. Building a simple LED circuit

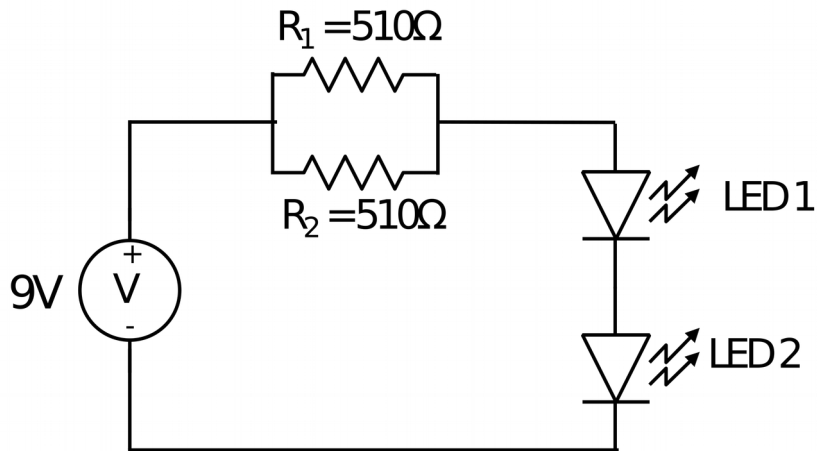


Figure 3. Simple LED circuit

2.1 Build this circuit on your protoboard. You can use either 510Ω or 470Ω resistors. You can also use any color (or color combination) that you want for the LEDs, but be careful not to use the infrared LEDs if you want to see the light! Note that the **direction of the LEDs** is very important because **LEDs are polarized and will pass current in one direction only**. See the spec sheet online. The longer lead corresponds to the anode (positive side). If they do not light up this is probably the issue. Try flipping the LEDs to see this effect.

Also, the point of this exercise is to get acquainted with proto-boarding. Therefore, **take your time and have a look at the various cables and connectors in your toolbox**.

2.2 Using the digital multimeter (DMM) in Voltmeter mode and a pair of hook connectors, measure the **voltage drop across** each circuit element. Be sure that you have the wires connected to the correct input terminals of the DMM and the function set to DC Voltage.

Q1. What voltage drops you measured across **R1, R2, LED1 and LED2**? **Q2.** Did you measure any negative voltages? If so, why is this? **Q3.** Did your circuit work the first time? **Q4.** Do you think that circuits constructed on protoboards typically work the first time?

Part 3 - For the Write-Up (DiMarzio section only; others may have different expectations)...

Answer the numbered questions, Qn in your notebook. Make sure the instructor or TA signs the book before you leave.

IMPORTANT: BEFORE YOU LEAVE THE LAB:

- (a) Place all of the components that you removed from the red tool box back in that box and return it to the cabinet that houses them**
- (b) Collect all used components and wires from your bench and place them in your group's reusable plastic container. If you are not going to use these components or wires again please discard them in the trash bin located in your lab room.**
- (c) Turn off all of the equipment you have used on your workbench.**
- (d) Make sure you return your protoboard, the equipment wires and your reusable container to the front window.**

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Last updated: Minor updates 5/17 and 9/17 by D. Brooks and N. McGruer, 9/2/16, N. McGruer, 1 hour, 20 minutes; 8/10/15, M.Niedre,