

ECE 214 - Lab #10 — DC–DC Power Supply

19 April 2016

Introduction: This is the final lab of ECE 214. You will design a circuit to increase the output voltage from a 9 V DC battery to 50 V DC. In the design you may use any combination of boost circuits (Lab 7 and Lab 8), multivibrator circuits (Lab 9), and low pass filters (Lab 3) to meet the specifications. Don't forget about loading effects (Lab 1). A block diagram of the DC–DC power supply is shown below in Figure 1:

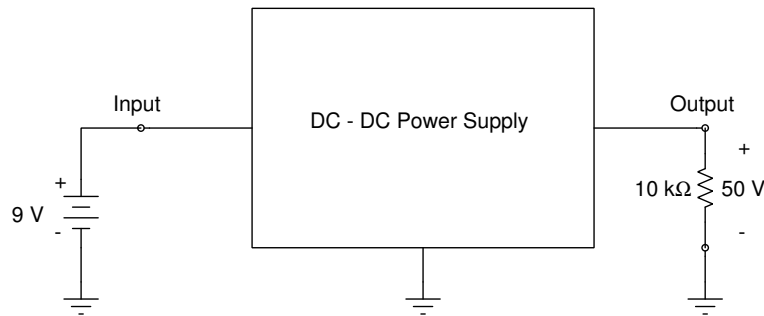


Figure 1: Block diagram of the DC–DC power supply.

Pre–Lab:

1. Design a DC–DC power supply to meet the following specifications:
 - (a) Input: 9 V DC battery
 - (b) Output: 50 ± 0.5 V DC with a ripple of less than 150 mV peak-to-peak.
 - (c) Load resistance: 10 kΩ.
2. Simulate the design in MicroCap.

Lab Procedure: Build and test your DC–DC power supply. Report all results in your laboratory notebook and in your final laboratory report. Indicate the best results that you were able to achieve.

Post–Lab: Produce a lab report describing the DC–DC power supply according to the instructions provided in ECP 214. Include the following in the report:

1. A detailed listing of all components in your circuit with part numbers.
2. Schematic of the DC–DC power supply and all sub–circuits.
3. Simulation results for the DC–DC power supply and all sub–circuits.
4. Test results of the DC–DC power supply including a photograph showing the circuit with the input connected to a 9 V battery and the output voltage displayed on the DVM and a measurement of the ripple on the oscilloscope.

5. Estimate the unit cost to build 4,000 power supplies. Use the guidelines discussed in class to estimate non-recurring engineering (NRE) costs and the manufacturing costs.
6. E-mail the final report as an attached PDF file to: kotecki@maine.edu by 5:00pm EDT (2100 UTC) on Tuesday 3 May 2016. (Note: only PDF attachments will be accepted.)