

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

Department of Electrical Engineering

DC Power Supplies

INTRODUCTION

Like most functional circuits, power sources perform best when properly designed and applied and can cause a lot of heartburn if not properly designed and applied. When designing an AC-to-DC power source, such design specifications as voltage and current ratings, line regulation, load regulation, and percent ripple become important features of the design.

ASSIGNMENT

The student is to devise and run such tests as needed on the attached DC power supply circuits to fully characterize their:

- a. Output voltage at full-load (assumed a full-load (rated) current of 0.5 A).
- b. Line regulation (use 100 VAC as the nominal input voltage and 85 VAC and 115 VAC as the respective V_{min} and V_{max}).
- c. Load regulation.
- d. Percent ripple.

REFERENCES

1. References on reserve in the library.
2. Textbooks on electronics or, specifically, power supply design.
3. Faculty with expertise in the area of electronics.

EXPECTED RESULTS (as a minimum)

1. A plot of output voltage versus load current up to a full-load (rated) current of 0.5 A for all three attached power supply circuits.
2. A sketch of the output voltage waveform at full-load (rated) current for all three attached power supply circuits.
3. Calculated values of line regulation, load regulation, and percent ripple for all three attached power supply circuits.
4. A discussion of the relative performance of the three power supplies.

WARNING: Monitor the power being dissipated in the load resistor....use a wattage rating appropriate to the situation !!!

POWER SUPPLY CIRCUITS

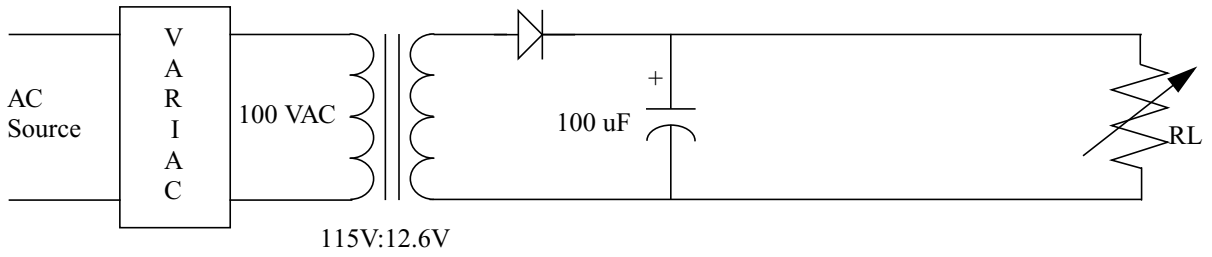


Figure 1. "Unregulated" Power Supply

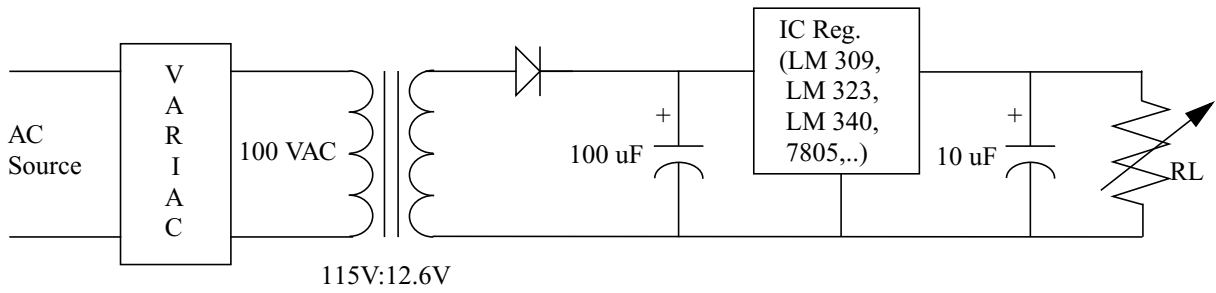


Figure 2. Regulated Power Supply "A"

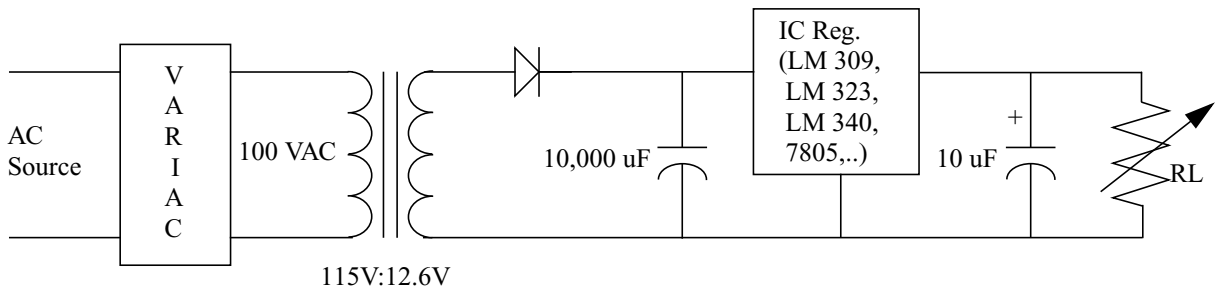


Figure 3 Regulated Power Supply "B"