DC-DC Switching Regulator

Using the LT1945 you will find what resistor values needed to obtain +/_ 15V rails.

Step(1)
Set the output voltage for Switcher 1 (negative output voltage) by choosing the appropriate values for feedback resistors R1 and R2.

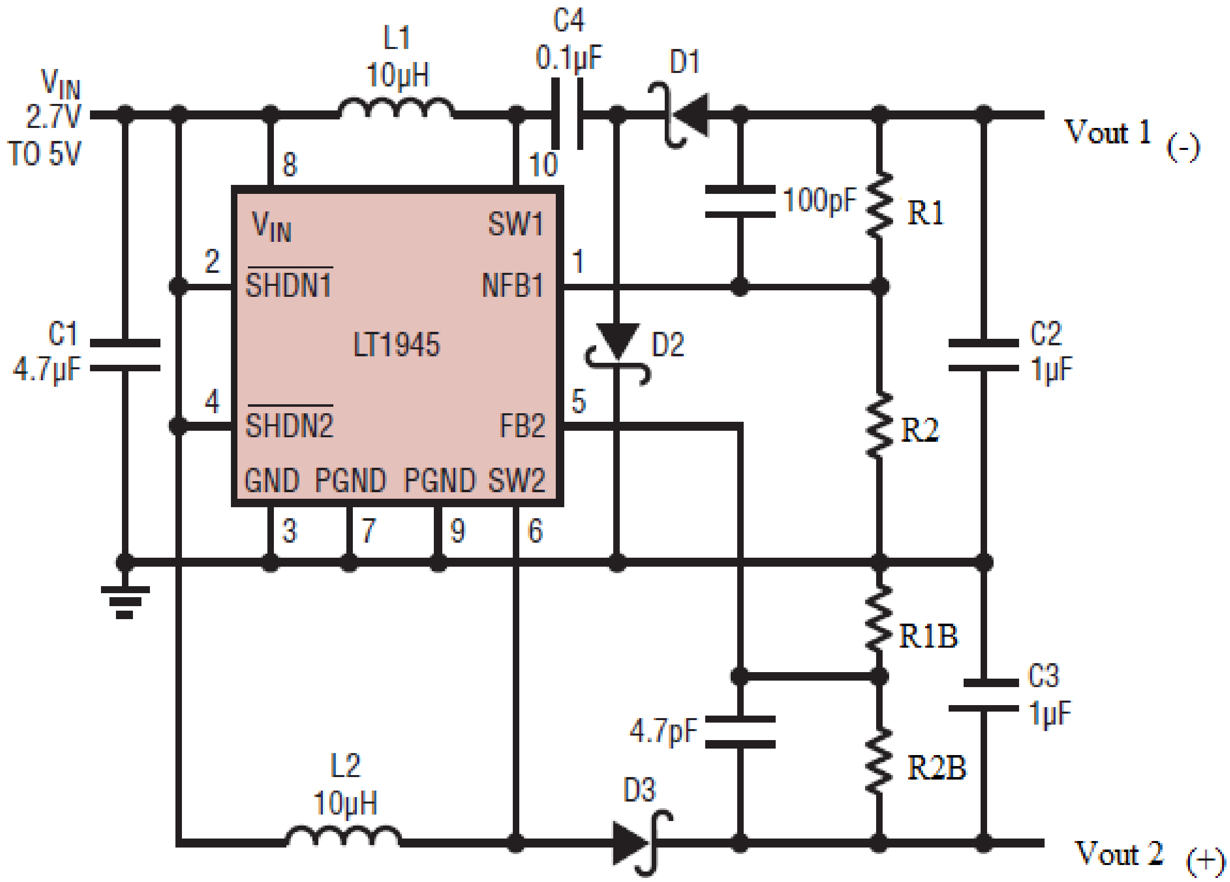
$$\mathbf{R1} = \frac{|Vout| - 1.23}{\frac{1.23}{R2} + (2 * 10^{-6})}$$

Step(2)
Set the output voltage for Switcher 2 (positive output voltage) by choosing the appropriate values for feedback resistors R1B and R2B.

$$\mathrm{R1B} = \mathrm{R2B}\left(\frac{\mathrm{Vout}}{1.23} - 1\right)$$

NOTE:
Some things to keep in mind while wiring up a switching regulator. When using a low value ceramic input filter capacitor, it should be located as close to the Vin pin of the LT1945 as possible. Try to run the feedback path as far from the inductor and noisy power lines as possible. You would also like the feedback path to be as direct as possible. The inductor, output capacitors, and output diode should be as close to each other as possible.

Step(3)
Wire up the negative rail first and check the output to see if it is the same as you calculated.
Next wire the positive rail and check if it's what you calculated.



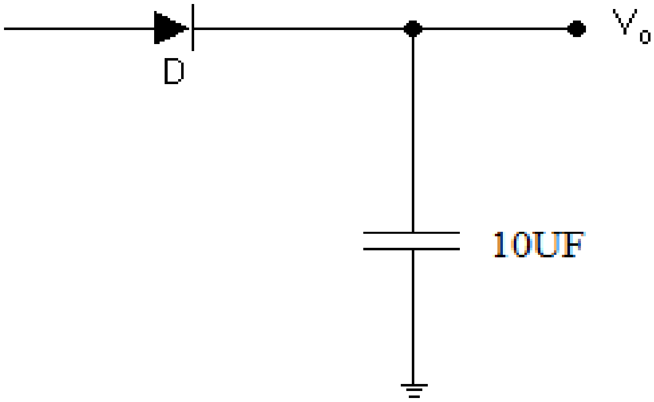
Step(4)
Look at pin 10, SW1, on the oscilloscope and describe what is going on here.

Step(5)
'Devise' an experiment to quiescent current of the LT1945. Also, calculate how many amps you can output before regulation droops.

Step (6)
After you have both rails outputting a +/- 15V wire up a non-inverting op-amp with a gain of 3 using the rails from the LT1945 to power your op-amp.

Step(7)
Verify with your TA that you have a gain of 3 on the O-scope. Compare the input signal with the output, and comment on the presence of switching noise (if it exists.) What does the power supply rejection ratio appear to be? Does this agree with your op-amp's datasheet?

Step(8)
Implement a peak decorator at the output of the op-amp.



Step(8)
Vary the frequency to see the behavior on the output.