

Category: Motor controls

## Motor Speed Regulator

This circuit regulates the speed of a small drill motor I use for PC board work. It is much handier for delicate work than a larger AC powered tool. The tool I have come with a useless 9 volt AC adapter. The motor would whine at high RPMs unloaded, but would slow to a crawl when loaded. This circuit solves the problem.

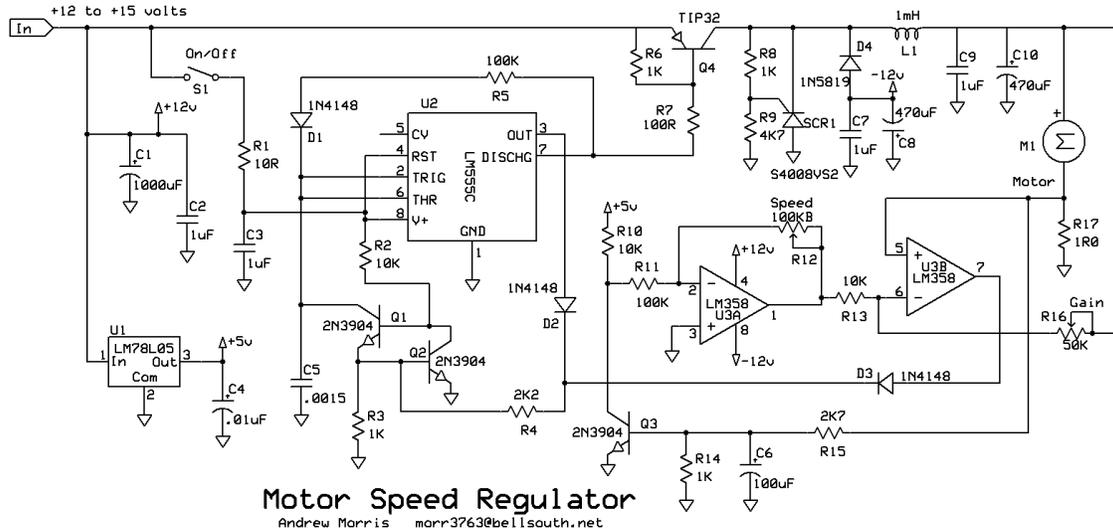


Figure 1 Schematic.

Q1, Q2 and U2 form a variable-frequency pulse width modulator, controlled by U3. Q4 forms part of a step-down power converter. Speed regulation is accomplished by sensing the motor current with R17 and using it as positive feedback to compensate for motor resistance loss. The gain pot should be set to a point just below the point where the motor speed oscillates. After finding this point, you may want to change the value of R11 to get better speed control range.

Q3 limits motor current. D4 and C8 capture some of L1's inductive kick to produce a loosely regulated -12 volts for U3. SCR1 acts like the usual flyback diode once C8 has stored the needed energy, preventing significant power losses.

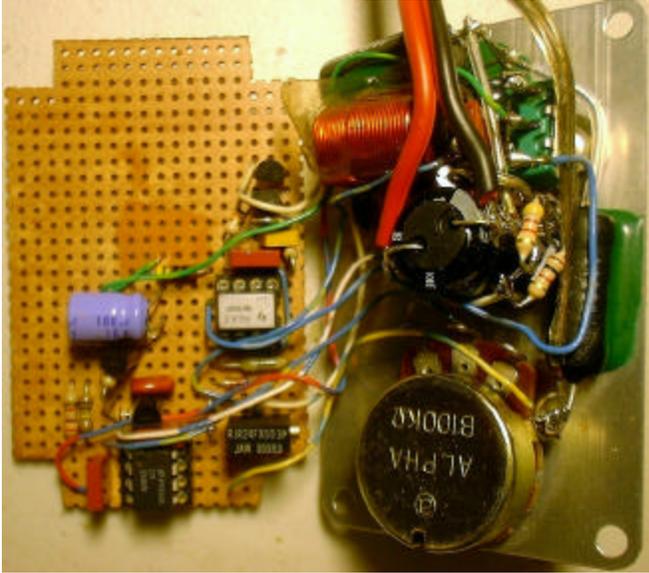


Figure 2 Interior view.



Figure 3 Exterior view.