

# Multiple Capacitor Charger

The circuit is shown in Figs. 1-2 and tested successfully. This is a 555 timer IC based charger. The circuit is operated by 8.4VDC. Oscillation frequency is determined from

$$f = \frac{1}{0.693 \times (R_1 + R_2) C_1}$$

For  $R_1=2.7K$ ,  $R_2=3.3K$ , and  $C_1=10nF$ , oscillation frequency is about 25KHz. Measured period is about  $40\mu s$  when there is no toroid load. In the presence of toroid, period shrinks to about  $30\mu s$ . So the frequency jumps from 25KHz to 33.33KHz. About 320mA total current is withdrawn from the supply.

L1 and L2 are bifilar wound coils around the same toroidal core as shown in Fig. 2. There are about 25 turns of each coil. L1 is wound using a 0.5mm wire. L2 is a thinner wire.

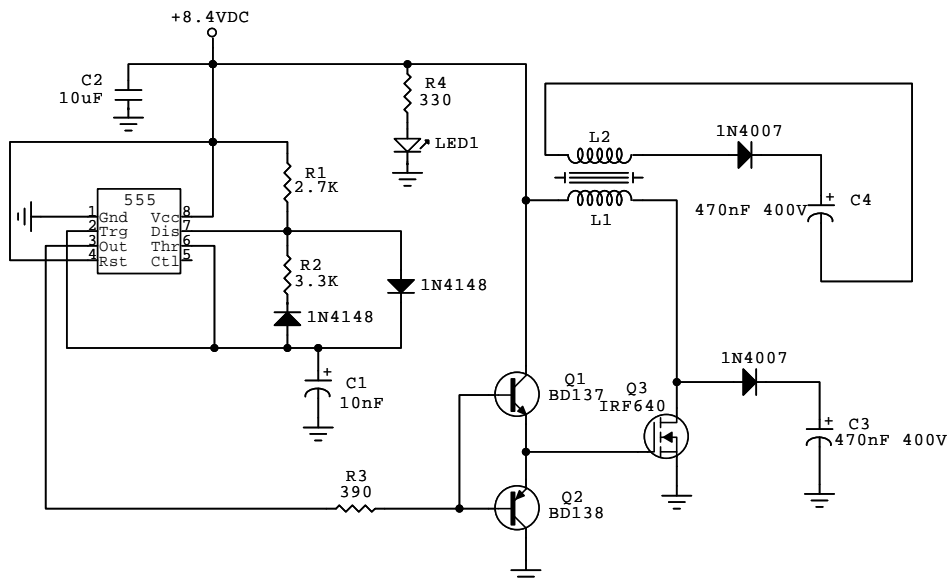


Fig. 1.

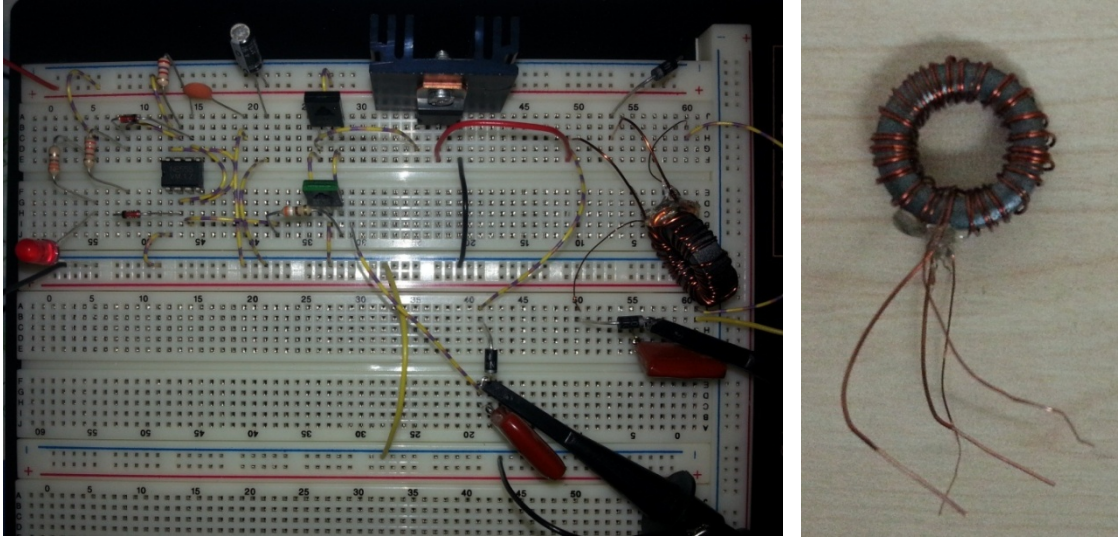
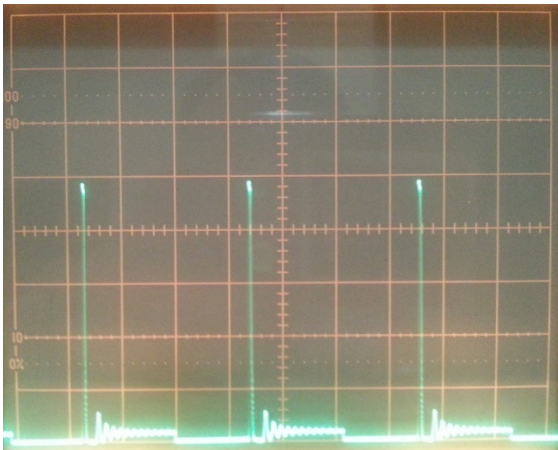
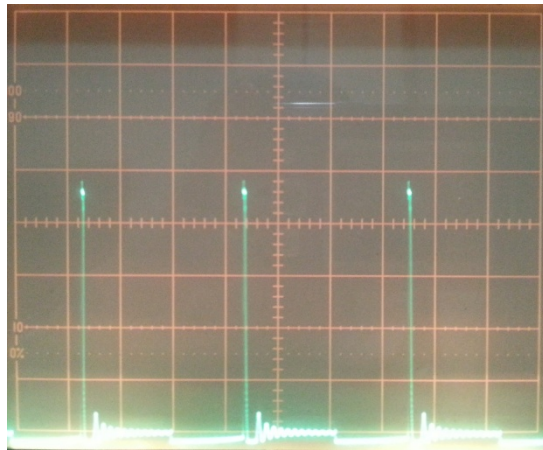


Fig. 2.

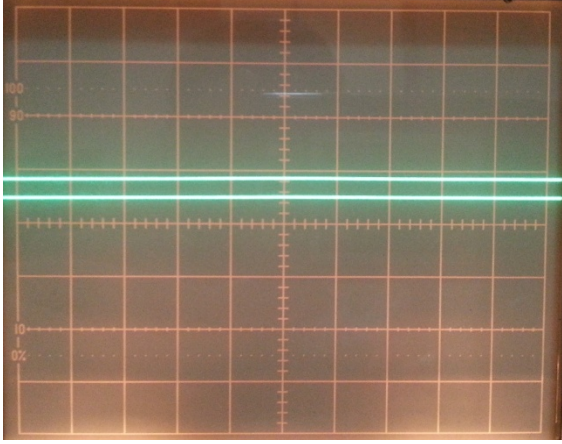
When I reduced the number of turns to about 16, I observed that the capacitors are charged to the same voltage and the supply current increased to about 560mA from 320mA. So less inductance means higher current, but the inductive kickback (IKB) voltage stays about the same for that number of turns. IKB across L1 and L2 are shown in Figs. 3(a) and 3(b). Capacitors C3 and C4 are charged to 240VDC and 220VDC through 1N4007 diodes as a result of this effect. This is shown in Fig. 3(c).



(a)



(b)



(c)

Fig. 3.

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