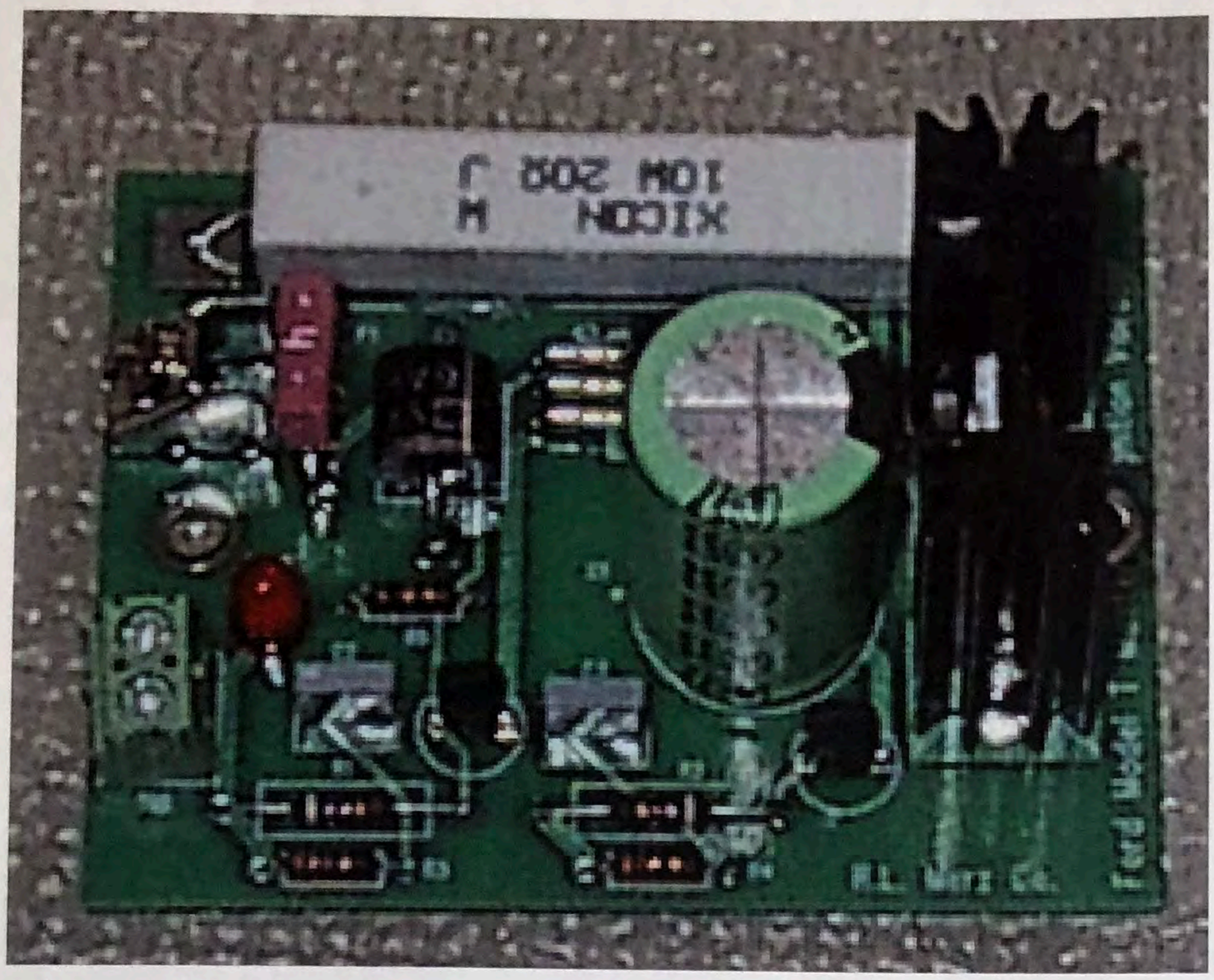
A Modern Master Vibrator for the Ford Model T Ignition System

Some Model T Ford owners have found difficulty in maintaining the proper vibrator contact adjustment on each of the individual coils. Additionally, the internal capacitor is often bad or its capacitance is out of tolerance. This article describes a simple electronic vibrator that eliminates the need for the contact points and capacitors.

The idea was to come up with something that does not require any permanent modification to the Model T. In the implementation of the master vibrator, each of the four contact points and capacitor is shorted out with a small jumper wire. Each jumper wire has fork type terminal lugs at each end, requiring only that the contact nuts be loosened to put the jumper wire in place. The contact point adjustment is not disturbed and removal of the four jumper wires returns to the normal Ford ignition system. The Master Vibrator circuit board requires three connections: 1.Ground, to the T frame 2. The hot wire from the ignition switch is removed from the terminal that is common to all four coils and connected to the Master Vibrator circuit board. 3. A wire from the Master Vibrator circuit board is now connected to the common coil terminal where the hot ignition wire had been connected. Although the small circuit board may be mounted most anywhere on the car, the most convenient place is on the firewall, near the connections to the coil box. It may be mounted with two small screws to the firewall (or tie-wrapped to the wire loom to avoid any extra holes in the wooden firewall).

Circuit Description: Power from the Model T is applied from the ignition wire, diode D1 rectifies the magneto (alternator) AC to DC, which is smoothed by capacitor C1. If your T operates only on the 6 volt DC battery / generator system (or systems modified for 12 volts) diode D1 may be eliminated and capacitor C1 may be much smaller (100 uf) or eliminated altogether. In no event should magneto power be applied to circuits that do not have diode D1 as damage to the circuit will result. Removal of D1 will allow a slightly hotter spark because it will no longer have the forward voltage drop across D1 (approx. 6 volts) this may be an advantage for 6 volt systems when starting the car in cold weather. Diode D1 may also be connected off the circuit board in the magneto circuit before the ignition switch that selects magneto or 6 VDC on some Model Ts. This connection will keep the diode out of the circuit when using the 6 VDC system. On Ts that use the magneto for lighting as well as ignition, the diode should be kept out of the lighting circuit.

Power is fed from C1 to an old – fashioned multi-vibrator type oscillator. The reason for using this type of oscillator rather than a timer IC like the 555 is that the 555 has a maximum supply voltage of 18 volts and some provision would have had to be added to clamp or regulate to 18 volts. The oscillator runs at about 200 Hz. whenever power is applied to the circuit board. On the coils that I used, this was, on average, their resonant frequency and provides the hottest spark. However, there are differences in Ford coils, especially some of the



aftermarket (new) coils. Those with technical knowledge may wish to feed Q3 with a signal generator and select R1 – R4 components for the optimum frequency for their coils.

The oscillator output square wave is taken from the collector of Q1 (or Q2) and is fed to the gate of Q3, when Q1 output is high (+) Q3 turns on and pulls R5 to ground, turning on PNP power transistor Q4. This happens at the rate of 200 Hz, with Q4 performing the function of the mechanical points and capacitor. Q3 acts as a buffer between the oscillator output and sinks the high base current of Q4 to ground via R5. R6 and the output indicator LED 1 are optional. If a high brightness LED is used, R6 should be about 10 K or 5.1 K with a standard LED.

The circuit is free running and each of the four individual coils is selected in turn by the Model T's commutator (distributor) that is not changed from the standard T configuration.

Parts List (All www.mouser.com P/N except as noted, www.digikey.com also has equivalent parts)

R1, R2- 594-5073NW4K700J (4.7K 1 W 5%)

R3, R4- 594-5073NW33K00J (33K 1 W 5%)

R5- 280-CR10-20-RC (20 Ohm, 10 W, 10%)

R6- 594-5073NW10K00J (10K 1 W 5%)

C1- 647-UHE1H222MHD6 (2200 uf, 50 VDC, 105 c)

C2, C3- 594-2222-370-11104 (.1 uf, 63 VDC)

D1- 280-6A10 (Diode, 6 Amp, 100 V min)

F1- 576-0297004.WXNV (Fuse, mini ATO, 4 Amp 32 V)

Clips for fuse, 2ea. 534-3544 (Keystone)

LED1- 638-333-2SDRDS5304 (Bright red)

Q1, Q2- 512-MPS651 (Fairchild, small signal NPN, many types will serve here, should have a min. 40 V collector to emitter voltage and current gain [HFE] of min. 50 – 100)

Q3- IRGB14C40LPBF (digikey.com, not available from Mouser, Intl. Rect)

Q4 -863-MJE5852 (PNP power transistor, 400 V, Motorola

¼" Spacers, 2ea. (If used) 761-1124-8-AL-7 (RAF)

Heat Sink for Q4 707-411915B02500 (Comair/Rotron, company has gone belly-up, part may no longer be available once existing stocks are depleted. If you use the Sunstone circuit board, a different style heat sink may need to be adapted)

TB1- 534-7702 (Keystone)

TB2 - 651-1935161 (Phoenix)

Fork Terminals 10ea. (8 for coil jumpers, two for TB1 connection) 159-2234

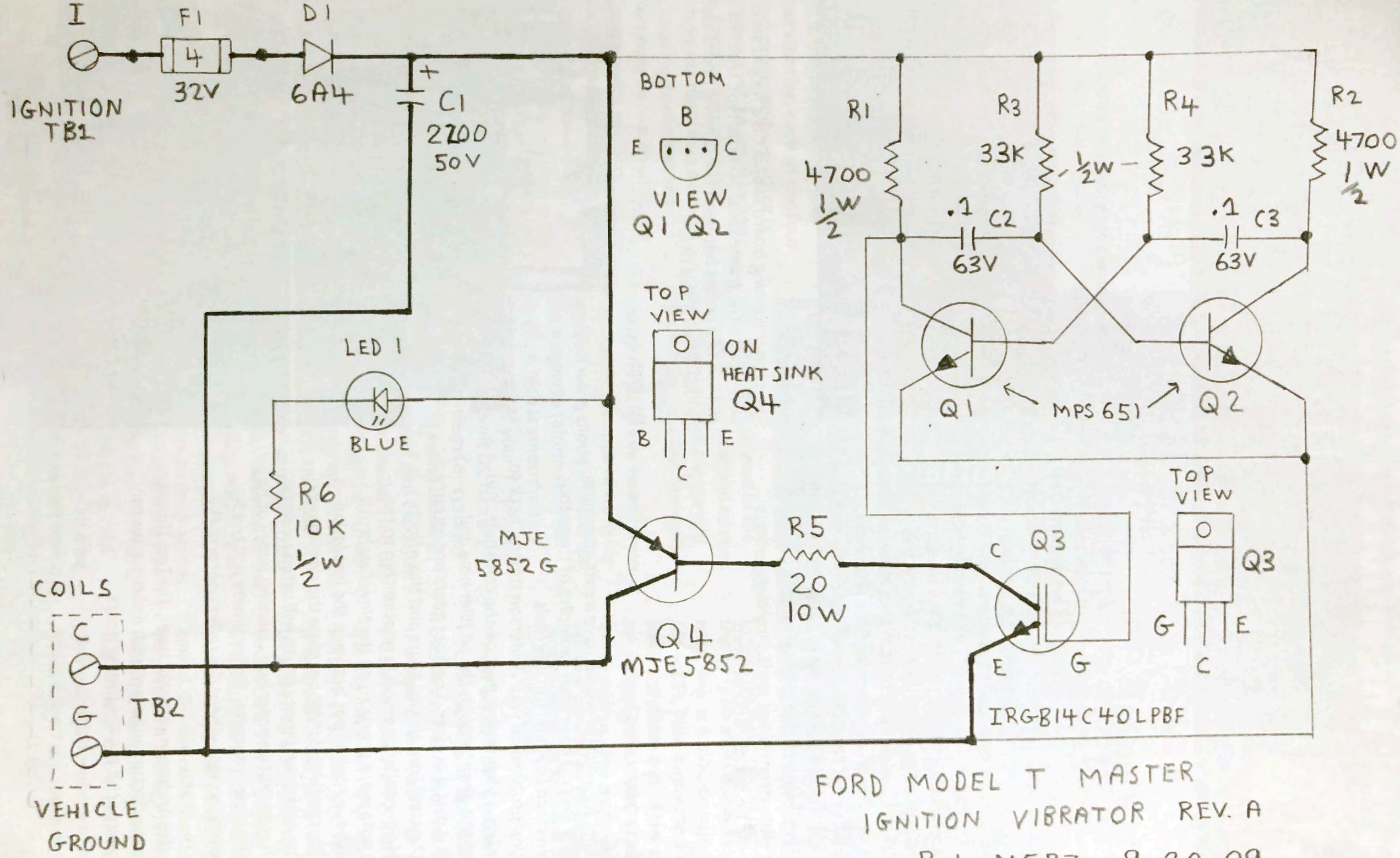
Wire, as required.

8 Wood Screws (If used for mounting)

A circuit board, as shown in photo is available from Sunstone at: www.sunstone.com

The article shows one of any number of ways to implement this circuit. Other experimenters may well find a better and simpler way to do this, perhaps using an O/A for the oscillator in place of the multi-vibrator, etc. The circuit may be easily built up on a small piece of fiber glass perforated board, 574-64P44WE or similar. Except for Q3 and Q4, most of the parts are common electronic parts available from a number of sources.

Craig D. Merz
820 Van Warren Road
Roanoke Rapids, NC
27870-8749



FORD MODEL T MASTER
IGNITION VIBRATOR REV. A
R. L. MERZ 9-20-09