Stewart Warner Model 970 Tachometer
Reverse Engineering Report, Rev 1.1
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The Stewart Warner 970 tachometer is an 8K RPM tachometer. It requires the use of a 990B Ignition Monitor module which conditions a standard ignition signal to safely trigger the tachometer.





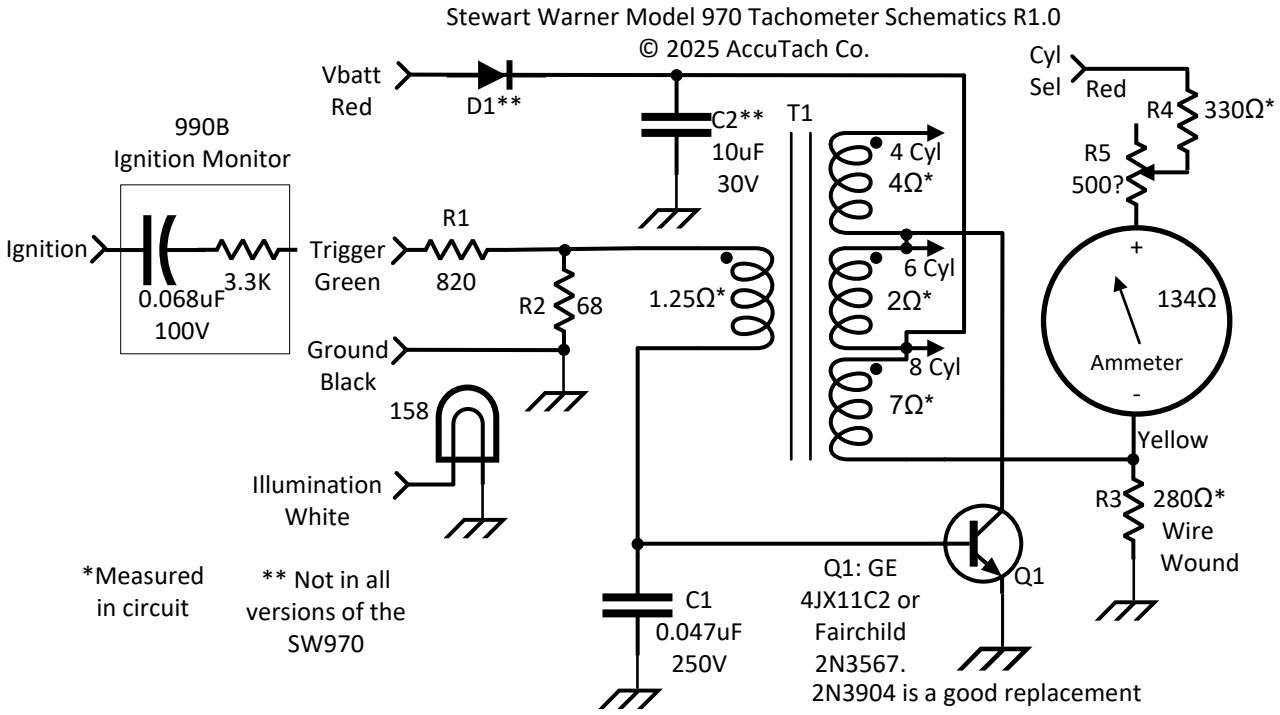




To disassemble the tachometer, carefully tap the bezel off the front of the tachometer at the 4 dimples in the bezel until it is free. Then remove the screw that holds the back on. Removing the two nuts on the back will free the tachometer works from the case to get at the electronics and the ammeter.

Schematics:

The Stewart Warner 970 tachometer consists of a one transistor blocking oscillator.



Theory of Operation:

The 990B ignition monitor module is a DC-blocking cap and a resistor that cuts the high voltage coil spike down to where it can safely turn on Q1, triggering the tachometer.

The current from the high voltage spike starts to flow through the primary winding and through the base of Q1, starting to turn it on. The current from the 6 cylinder secondary winding helps Q1 to turn on and feedback through the transformer sends more current into the base of Q1, quickly saturating it. As this is happening, induced current also flowing through the secondary winding and through the ammeter via the selected cylinder tap.

The inductor current slowly increases until the currents through Q1 cause it to fall out of saturation. At that point, the feedback via the transformer causes Q1 to quickly turn off.

Calibration is done by adding or subtracting resistance to the ammeter circuit.

I have recently analyzed another 970 tachometer which has a slightly different power supply circuit. In it, Stewart Warner engineers added a diode to protect against reverse battery polarity (usually due to accidental jumper connection errors) and a 10uF filter capacitor to knock down any electrical noise from the alternator. The transistor in the later tachometer was a Fairchild 2N3567. From the specs of that transistor, the 2N3904 is a good replacement.