Sun SST-801 Electronic Tachometer Analysis

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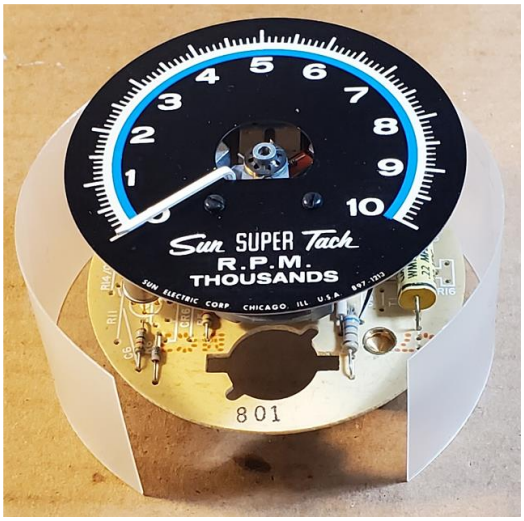
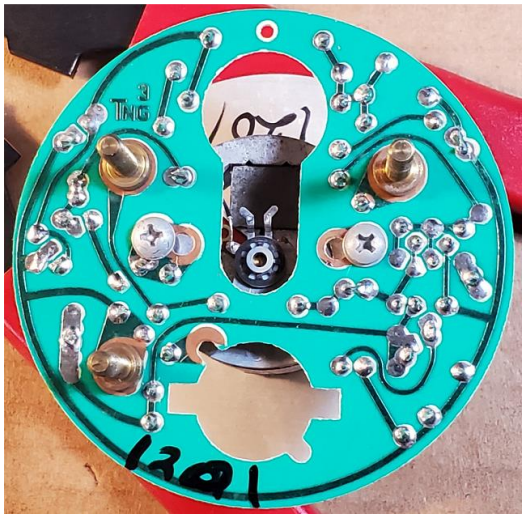
Rev. 1.0

I received a non-functional Sun SST-801 tachometer from a customer for me to reverse engineer.

In order to gain access to the electronics, the chrome bezel must be uncrimped:

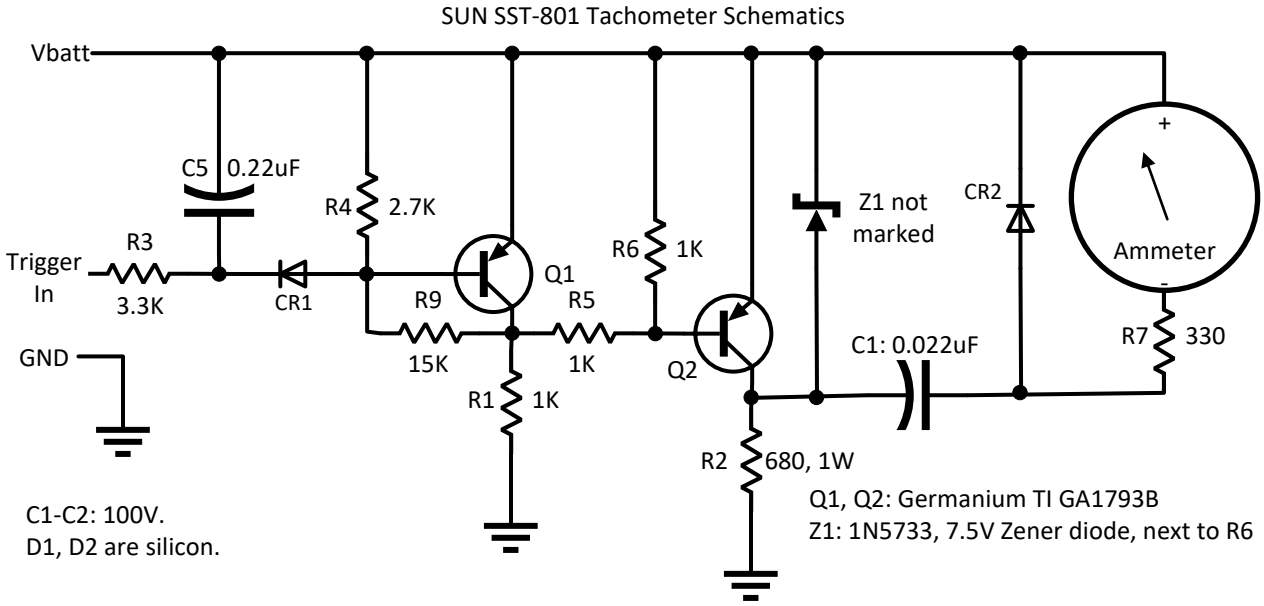
After the bezel has been removed the tachometer innards can be removed by removing the nuts on the power terminal, the trigger input terminal and on the ground terminal. Notice that this design isolates the case from the electronics, which allows installation in a positive ground car. There is even a plastic sleeve that surrounds the entire guts of the tachometer.





Since this tachometer uses a PCB, the components are clearly marked on the top of the PCB, except for the Zener diode which is next to R6. this is a photo of the bottom of the PCB.

Here are the schematics:



The tachometer had an open meter so it was impossible to characterize the ammeter. The electronics all seemed to be functional.

Theory of operation

R3 protects CR1 by limiting its current. R3 and C5 form a 220Hz low pass filter that filters out any high frequency noise in the ignition signal.

Whan the points are open, the Trigger In signal is typically at 12V (or above with coil ringing.) Not enough current flows out of the base of Q1 to turn it on, so R1 and R5 draw enough current out of the base of Q2 to turn it on. With Q2 on, the collector goes to battery voltage. Any charge in C1 will cause the voltage on the other side of them to go above battery voltage, only to be completely discharged by CR2 so it will not go through the ammeter the wrong way.

When the points close, enough current can flow from the base of Q1 to turn it on. The collector of Q1 pulls the base of Q2 up to battery voltage, turning Q2 off. That allows C1 to charge to battery voltage minus Zener voltage (7.5V) through R7 and the ammeter causing the needle to deflect.