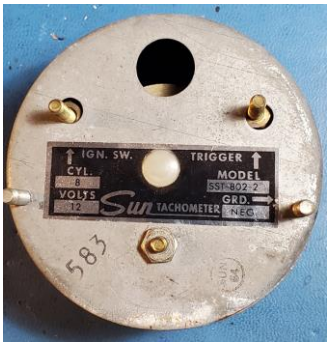
Sun SST-802-2 Electronic Tachometer Analysis

Mark Olson

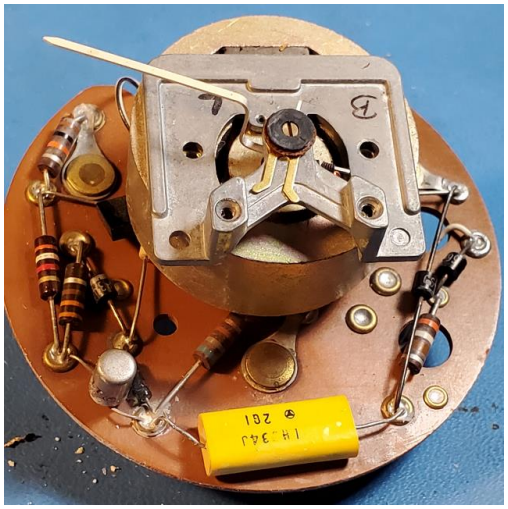
Rev. 1.2

I received a non-functional Sun SST802-2 tachometer from a customer for me to reverse engineer.

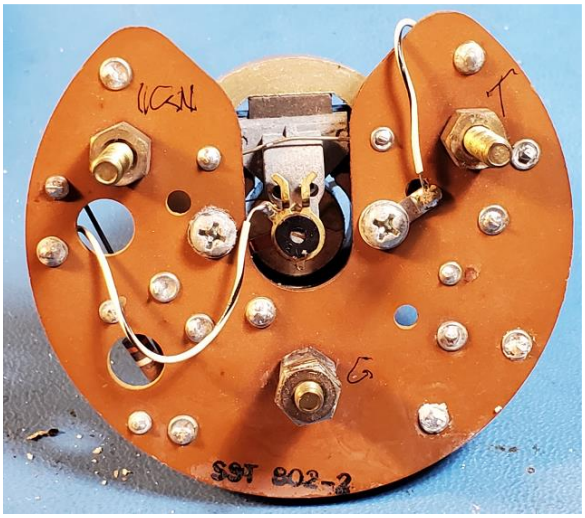


In order to gain access to the electronics, the chrome bezel must be uncrimped:

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 stud at the center of the nameplate. Then, removal of three screws allows the tachometer face to be removed, exposing top side of the PCB.

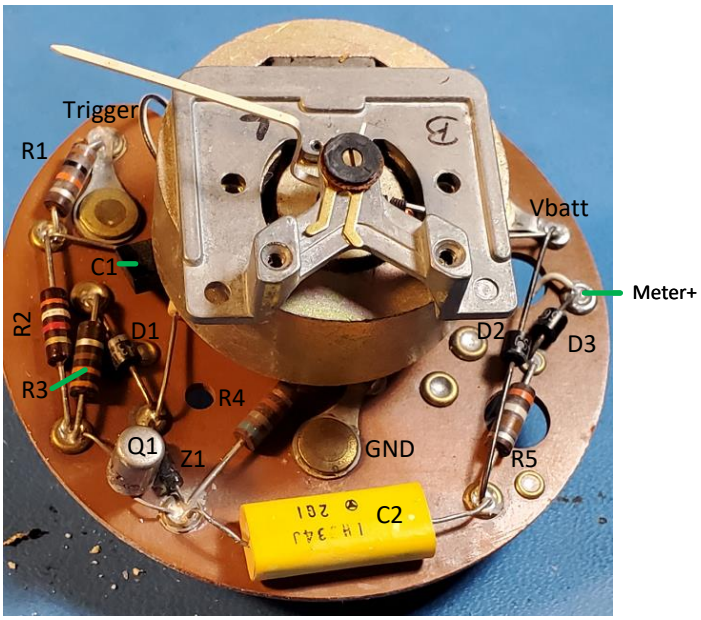


PCB Top

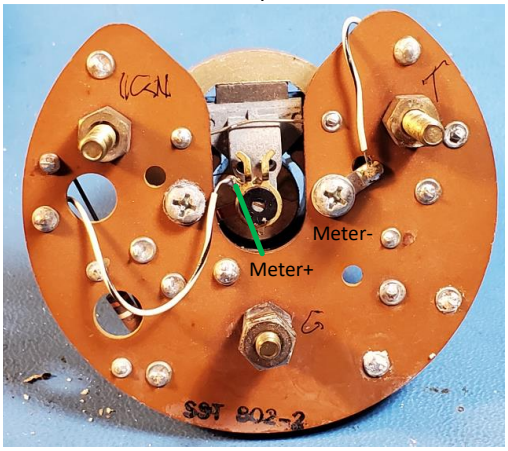


PCB Bottom

Here are the component designators for the components on the PCB.

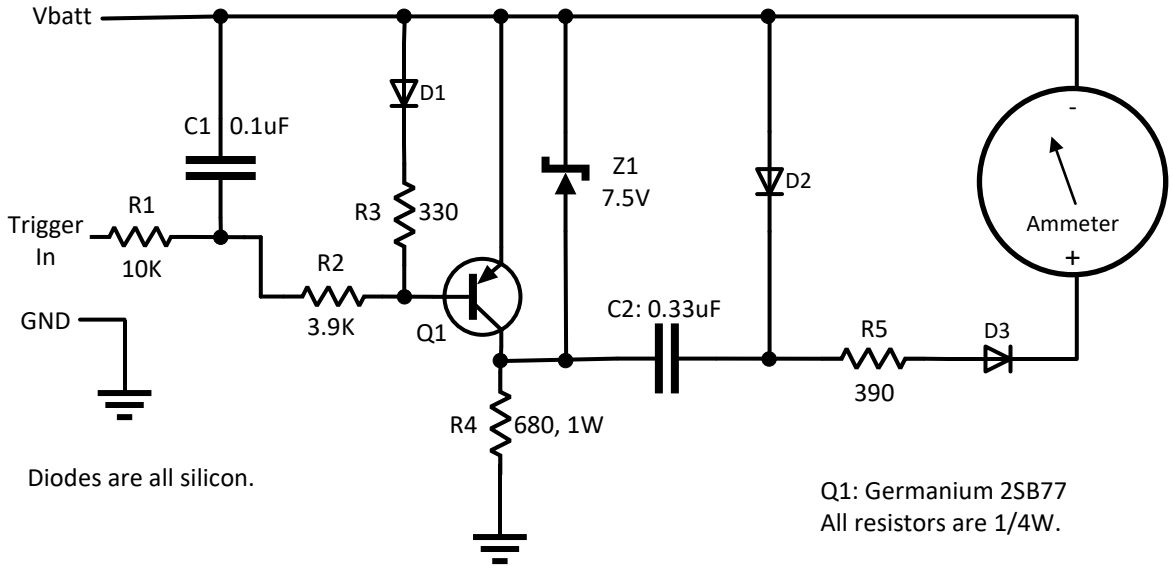


Top



Bottom

SUN SST-802-2 Tachometer Schematics



Diodes are all silicon.

Q1: Germanium 2SB77
All resistors are 1/4W.

The tachometer had a broken hairspring so it was impossible to characterize the ammeter. Based on the scope, the circuit is working at least as far as Q1. It is not clear what the value of C2 should be.

Theory of operation

R1 and R2 protect Q1 by limiting its base current. R1 and C1 form a 160Hz low pass filter that filters out any high frequency noise in the ignition signal. That is much lower than I expected, but not much voltage drop is required to turn Q1 on, so the cutoff frequency isn't really a useful metric.

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 the collector of Q1 goes to 7.5V below Vbatt. C2 charges to 7.5V via D2 and no current flows through the meter.

When the points close, enough current flows out of Q1's base that the transistor turns on taking Q1's collector to Vbatt. The other side of C2 jumps to 7.5V above Vbatt, and begins to discharge through the meter, deflecting the needle.