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Update to the Hallicrafters Model S-107 5-Band Communications Receiver Article: Adding a 1 MHz Crystal Calibrator

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After the Hallicrafters S-107 project in ER #394, November/December 2022, was a wrap, I started thinking about adding a 1 MHz crystal calibration oscillator to the S-107. The dial calibration for bands B and C were pretty close, but I thought the S-107 could still benefit for having an on-board calibration

oscillator. One of the considerations for starting this additional project is that other than the few hours of labor involved, I had all the parts.

Adding the Calibrator

I decided to use a 1 MHz 6BZ6 crystal oscillator using an HC-6 1 MHz crystal. This oscillator was “left over” from my FT-243, etc., crystal research in 2014/2015. The 6BZ6 circuit is identical to the 100 kHz calibration oscillator used in the Hammarlund HQ-100AC and others, and is built on a 2" x 3" x 0.062"

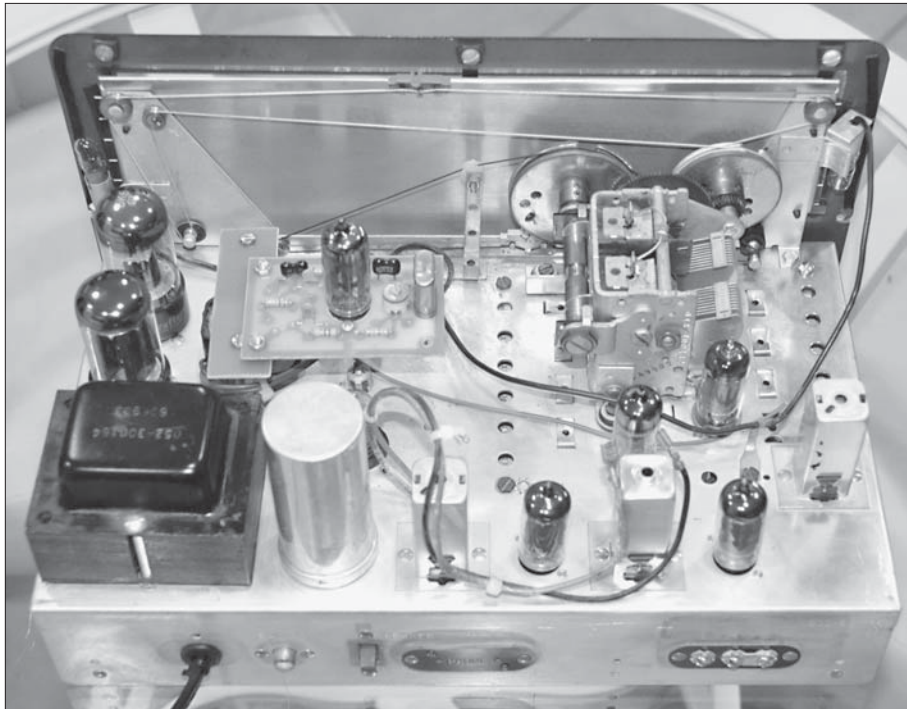


Figure 1, The Added 6BZ6 1 MHz Crystal Calibrator: Notice the wire routed across the chassis and wrapped around V1/6BA6 – the calibrator’s output “gimmick capacitor.”

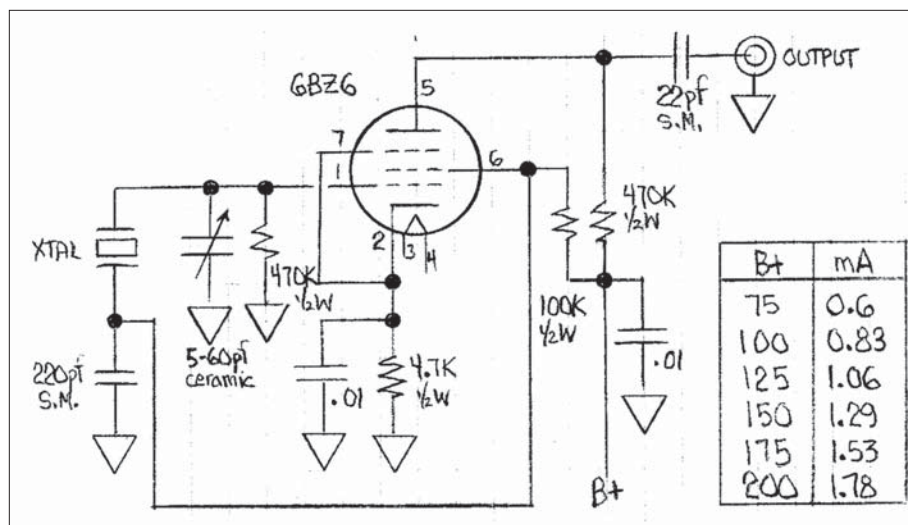


Figure 2: The 6BZ6 Calibrator Schematic

single-sided, glass-epoxy, printed-circuit board.

The wiring in the S-107 is "tight" so there are not many opportunities to drill additional mounting holes. So, I decided to drill out the rivets for the audio output transformer, T14, and install two round 1/4" x 1-1/2" threaded spacers to add a small piece of 0.062-inch printed circuit board material above T14, and using that to install the calibrator. Initial measurements indicated that I had just enough clearance to clear the S-107's speaker.

The calibrator was mounted on that piece of printed circuit board using 6-32 x 1/2" binder head screws and small-geometry hex nuts. The calibrator PCBA was offset-mounted to fit between V4/6AL5 and V6/12AX7. The calibrator was orientated such that the HC-6 1 MHz crystal was the farthest from the heat of the V7/6K6GT and V8/5Y3GT.

#6 external-tooth lock-washers were used at every step to insure good ground integrity.

The calibrator's 1 MHz output was connected to a 20 AWG solid green wire that was routed across the chassis with a one-turn wrap around V1/6BA6, as a "gimmick capacitor."

I decided to use the Noise Limiter switch (SW3) to control the calibrator. I disconnected the existing wires and covered their ends with heat-shrink tubing so that the modification could be quickly reversed. The only "hitch" is that the calibrator is powered on when the Noise Limiter switch is off!

Power-wise, I decided to power the calibrator from two 1N5368B 47-volt, 5-watt Zener diodes in series. These were connected to the 202.4 VDC line through a 33k, 10%, 2-watt, carbon-film resistor. The Zener diodes were bypassed to ground with a 0.01-μfd, 1kv ceramic-disk capacitor. Those components were added to a new 3-position terminal strip and installed with the 6-32 hardware used to install the 1-1/2" spacers from T14's drilled-out rivet holes.

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