

Classic Radio



Reviving the Kenwood TS-530SP Hybrid

In the late '80s, I was enjoying the thrill of SSB voice HF via my newly acquired Technician-class privileges, on 10 meters using a single-band Uniden HR2510. Twenty or so watts were plenty for making reliable 10-meter contacts during the fantastic sunspot activity at that time. Soon, however, I grew tired of the single-band rig.

I decided I wanted the Kenwood TS-530S Hybrid radio (see the lead photo). This would contain all the HF bands, plus the WARC bands and 100 W of power. I placed an order for a used TS-530S advertised in a catalogue and eventually acquired most of the matching station accessories to complement the rig, such as the SP-230 speaker, AT-230 antenna tuner, VFO-230 external VFO, PC-1A phone patch, MC-50 desk mic, and both CW and SSB optional filters.

This was quite an impressive station, but I found myself looking for the elusive TS-530SP, which included an audio notch filter. I finally found one that was clean and met my cosmetic requirements, and sold my TS-530S to purchase the SP.

Eventually, I sold it and replaced it with a Yaesu FT-840. I upgraded to an Amateur Extra-class license and owned several HF rigs. However, nos-

algia kept bringing me back to the TS-530SP, so I set out to find one again.

Background

Kenwood's HF Hybrid line included the TS-520, TS-820, TS-530, and TS-830 series of radios. Many of these base models went through an enhancement phase during their manufacturing run, and were then designated by suffixes added to the base model number. For example, the TS-520 became the TS-520SE, meaning it was the "economy" version, with some features eliminated.

These were called "Hybrid" rigs because they were designed to bridge the transition from all tube-type transceivers to solid-state transceivers. "Hybrid" was a reference to the radios having a solid-state design except for the driver and final section, which still used tubes. In the case of the Kenwood line, that meant a 12BY7A driver and 6146B/S2001A final tubes.

These Hybrids were produced from the mid-1970s to the late '80s and possibly early '90s. The 530 and 830 incorporated digital frequency readout to 100 Hz resolution as standard. The 520 and 820 series utilized an external DG-5 and internal DG-1A, respectively, for readout of digital display.

Standard modes of operation were SSB and CW (FSK on some models). Bands of operation included 160 – 10 meters and the WARC bands on the 530 and 830 models. Ten or 15 MHz was utilized for WWV frequency reference on some models, and a 25 kHz marker generator was included. The features varied by model number, but they included RIT, VOX, noise blanker, attenuator, XIT, speech processor, IF shift, notch filter, variable bandwidth tuning, and IF output. They also featured the ability to install narrow SSB or CW crystal filters in the IF. These units did not include general coverage receive.

External accessories to further enhance the operating flexibility included items like speakers with AF filters, external VFOs for split operation, external antenna tuners, monitor scope with panadapter, phone patch units, and desk microphones. Prices varied by model and were in the range of \$600 – 950.

Acquisition and Repair

My search for a TS-530SP took me to all the usual places — hamfests, ham-oriented websites, and eBay. Eventually, I found a clean rig advertised and everything on it worked, except there was no high voltage for the finals, and the transmit capability

was untested. I had some knowledge of the high-voltage doubler circuit, so I knew Kenwood designed it not to self-destruct and take out things like the power transformer.

While the rig was being shipped, I started formulating my diagnostic plan. When it arrived, I opened the unit and cover of the final section with the intention of removing the plate caps from the final tubes to check for a plate circuit short to ground. However, the final tubes were missing. No other issues were detected in the plate circuit. Next, I wanted to look at the 900 V plate supply to see if the filter caps were open, whether any diodes were blown, or the high-voltage winding of the power transformer was open.

Turning the unit upside down revealed that the high-voltage capacitors had been replaced, and the soldering and replacement techniques weren't up to my standards (see Figure 1). I pulled all that out, disassembled it, checked the caps for value and leakage, and found them to be okay. I also checked the bleeder/balance resistors and found they were in tolerance. While these parts were out of circuit, I checked the diodes in the high-voltage section and they were fine. I also brought the rig up to 120 V ac via a variable transformer, and checked the high-voltage output winding without discovering any problems. I reinstalled the high-voltage caps and cleaned up the wiring. Upon ac power application, I had 900 V dc in the high-voltage power supply circuit.

Troubleshooting Transmit Mode

I connected a dummy load to the antenna connector and placed the rig in SSB transmit mode to verify the idle plate current and high voltage. After making connections and setting the rig up for SSB transmission on 20 meters, I activated the send switch. Nothing happened. The radio remained in receive mode. I checked to be sure the screen grid switch was set correctly and looked for other set-



Figure 1 — A look at the inner workings of the TS-530SP.

tings I might have missed, but I found nothing out of the ordinary. PTT did not place the rig in transmit mode either. Additionally, there was no indication of high voltage when the meter selection was placed in high-voltage mode.

Looking at the schematic, I determined that high voltage would not show up on the meter until the transmit/receive relay was picked. Review of the AF board schematic revealed a relay circuit utilizing a PNP transistor (Q12) to source current to ground via the relay coil. Probing the circuits leading up to the base of this transistor indicated they were working correctly by responding to the PTT and send switches, but the base to emitter voltage of Q12 would not drop the required .7 V to turn on the transistor.

I removed the AF board to pull the transistor and check it for proper operation. I determined that this part had been replaced, because the part ID did not match the parts list, and neither did the pin-out. I located a 2N4403 that had sufficient specifications, and formed the pins to match the pads. After reinstallation of the board, I applied power and the send

switch picked the transmit/receive relay; both the plate idle current and high voltage were displayed on the function meter.

I gave the rig a full alignment to perk it up, and checked and replaced the grid and bias resistors as needed. I didn't find any other issues. With a decent set of used and neutralized 6146B tubes, its output power was over 100 W CW on all bands, except 10 meters, where output was about 90 W. PEP output was over 100 W on all bands.

Final Thoughts

On the air, reports are just as I remember from the late '80s. The receiver is quite sensitive, and CW is pleasant to copy with the 270 Hz IF filter installed. The noise blanker on this model does not seem very effective on line noise, but may be more effective on strong pulse noise. It's a basic HF rig of good quality, easily repaired, and worth going through the proper dip and load process for tube finals to get this Hybrid back on the air.

All photos by the author.