

EVOLUTION OF A RADIO TYPE - HALLICRAFTERS PORTABLES

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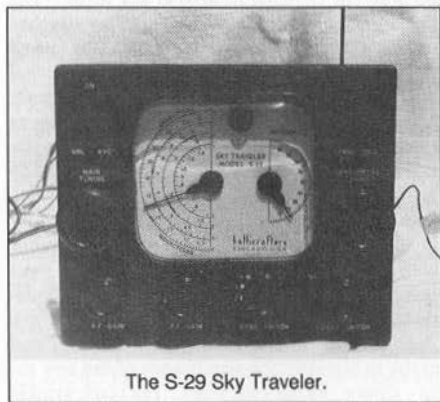
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Many of you can remember with me, the years just prior to World War II. During that time manufacturers were both developing new products and improving old ones in a valiant effort to capture the "tight" consumer dollar. All industries were in an expansionary push and the radio industry was no exception. New designs were appearing on the market at a fast and steady pace.

The Hallicrafters Company of Chicago was an eager participant in the race, with new products introduced in what seemed like a daily occurrence. In the late '30s they foresaw the need in the marketplace for a portable AC-DC-battery full-coverage HF communications receiver. Such users as fire and police forces and forest rangers (heavy users of HF radio at the time), as well as amateur operators, were to be the main market for the receiver. Also, with some luck, the Lend-Lease program, then getting started, might re-

they do the most good performance-wise. Four bands provide full coverage from 540 kHz to 30 MHz. A non-calibrated (0-100 scale) bandspread feature is included for 80, 40, 20, and 10 meters. Unusual with battery receivers, there is a low-drain pilot lamp: a neon-lamp relaxation oscillator which flashes periodically. There was also a charging feature to extend the life of the (theoretically non-rechargeable) dry batteries. Price (early 1942) was \$69.50. A mounting bracket was offered for installation in an automobile. Hallicrafters simultaneously offered the RE-1 Sky Courier, a portable in a considerably different physical layout. It had a somewhat simpler circuit, but also used a durable metal case.

The S-29's one electrical demerit is the use of line-cord resistors. To compound this demerit, not one but two resistors were used: one for the heater of the 50Y6 rectifier, the other for the ra-



The S-29 Sky Traveler.



The S-39 Sky Ranger.

quire such a radio.

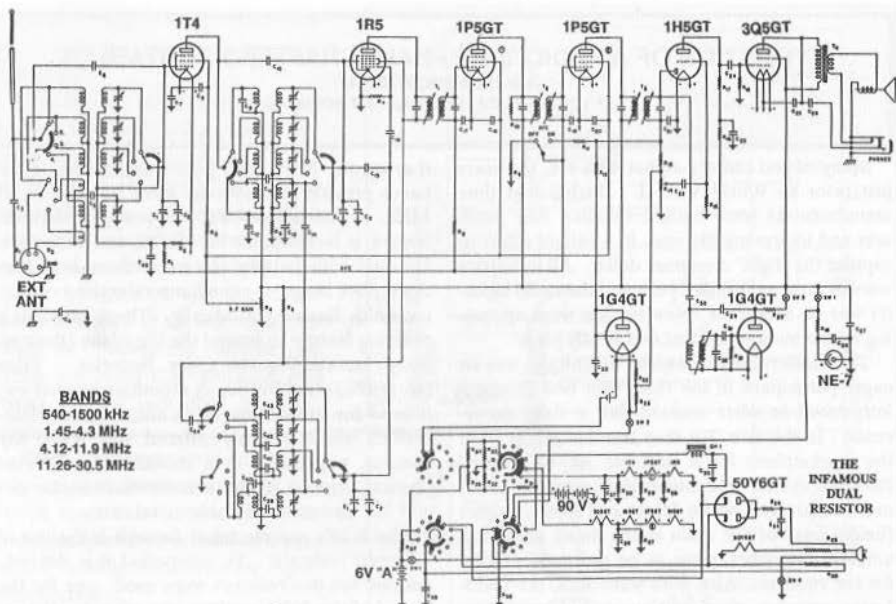
Thus was born the Hallicrafters S-29 Sky Traveler receiver - a 28-pound (including batteries) portable with a 24' built-in whip antenna. Housed in a sturdy aluminum case, sporting a rugged leather carrying handle, the S-29 came to market. The photos show the author's S-29 in restored state, ready to be slipped into its case and just about set to go anywhere - except possibly on an airline trip, since today's flight personnel are funny about such things.

The receiver has excellent electrical characteristics, which include a tuned RF stage, two-stage IF system, BFO, and noise limiter. The S-29 marked Hallicrafters' first use of the miniature tubes introduced by RCA in late 1939. It uses them sparingly, in the RF and converter stages where

dio-circuit filaments. I have never seen a line-cord resistor with two 450- Ω sections. I never knew they existed, and since, when I purchased the S-29 the cord had long since been replaced, I still have yet to see one!

The S-29 has a unique noise limiter. A separate tube (1G4GT) is used, which derives filament power from its own 1.5-V "D" cell. A front-panel switch controls the circuit operation. Apparently noise limiting was a feature seldom needed in the '30s and the use of the separate battery et al. gave the operator this feature if he happened to be near automobile traffic or neon signs.

The S-29 was bought by the U. S. military and coded R-62/PR. The FCC used it as a field-investigation receiver (see *AWA Review*, Vol. 5, p. 80). Most receivers in civilian hands lost their



battery-operation feature in 1942 and later as supplies of batteries disappeared in favor of military needs.

For all the advanced electrical features of this radio, its mechanical design left a great deal to be desired. The front panel of the S-29 is not attached mechanically to the chassis, but rather "floats" on the panel switch wiring until the unit is assembled in the case. The location of the whip antenna interferes with the AC power switch, resulting in misalignment which gives stiff operation of the antenna. The speaker and external-antenna plugs are attached to the sides of the case and hence must be wired after the chassis is inserted in the case. The mechanical design of the S-29 did not consider maintainability.

It is unknown how many S-29s were produced (mine is S/N 146 066) but the evolution of the type came soon. The production engineering department had a "field day" with the set and produced in short order the S-39 Sky Ranger.

Born in the war years (the schematic in Rider's Vol. XVI is dated June 1944), the S-39 has the general appearance of

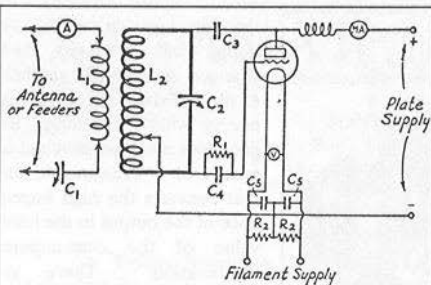
the S-29 but deviates in several key areas. The speaker and antenna connectors are now attached to the radio chassis, the whip antenna was moved aft, giving smooth operation, and the front panel is now firmly attached to the chassis. The result: the entire radio can be removed from the case as a complete entity. Electrically, the AC power cord lost its dual 450 Ω resistors; now, two 35Z5 rectifiers provide line rectification while two power-dropping resistors are attached to the chassis and front panel. The separate noise-limiter tube with its dedicated filament battery was replaced: the BFO tube became a 1H5 diode-triode, with the diode as the limiter.

As a result of this evolutionary design - and maybe to highlight the significance of the new radio - a color change took place. The black wrinkle of the S-29 became olive-drab and the smooth SX-28 type knobs became the larger rugged knurled knobs typical of Army equipment. You guessed it - the S-39 went to war as the R-80/PR. Perhaps some S-39s were made in black wrinkle. If a reader knows of any I would appreciate a note.



The S-29, disassembled.

The S-39 was
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HARTLEY TRANSMITTER

A - Thermocouple ammeter, 0-1 A.

V - AC voltmeter, 0-10 V.

MA - DC milliammeter, 0-100 mA.

C1 - 500-pF receiver-type variable

C2 - Same, "of good quality."

C3 - 500 pF*.

C4 - 250 pF*.

C5 - 2000-pF*.

* High-grade 500-V receiver types or special transmitting type.

R1 - 10 K transmitting grid leak.

R2 - 50 or 100 Ω , or Christmas-tree lamps.

RFC - 160 t. No. 30 DCC wire on 3/4" dowel.

L1 - See text.

L2 - 1/2" copper tube wound on a mandrel (water pipe with 2-3/8" OD); ends hammered flat and drilled. For 80 m, 12 t.; for 40 m, 5 t.; for 20 m, 3 t.; for 10 m, 2 t., for 5 m - you aren't really going to put this thing on 5 m, are you?

Wood baseboard, 10" x 12".

Two glass towel bars with wood supports.

for this old design. The note does change on windy days as the antenna swings.

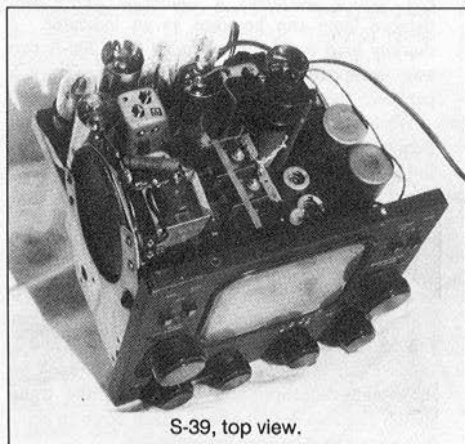
Old-timers are enchanted when they hear that musical self-oscillating note that brings so many memories. A novice asked me where he could buy one. My XYL tells me to QRT every time she wants to watch her favorite soap opera. Yes, ladies and gentlemen, it's sad to say, but Hartleys are notorious TVI-makers, so be careful about operating times and use a low-pass filter just in case.

9. Voltage stability and the note improve considerably by the addition of a couple of 0A2 tubes in series, connected across the output of the power supply, in parallel with the bleeder resistor. These tubes are rated to regulate at 150 volts each; more than enough to feed a single 210 tube. The result is a very small drop of about 8 volts when the rig is keyed. Without them, a drop of around 50 volts was a normal occurrence during operation. No wonder I got some "birdies" reports, although I tried to keep chirp at a minimum by the precautions mentioned above.

I use a power supply built with an old TV transformer. The output before regulation is slightly over 400 V. The 6.3- and 5-V filament windings are connected in series, then reduced to 7.5 V with a 20-ohm rheostat. The rest of the circuit is conventional: diode rectifiers, choke and two 40- μ F 500 V caps. The bleeder is 25 K, 25 W.

The next QSO Party is getting near, if you want to participate in it get to work, OM. You won't regret it!

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S-39, top view.

produced into 1945, when it was officially dropped from the Hallicrafters sales literature with the

stamped note "production suspended." The paper trail is sometimes slow to react, however, since I have a tech manual (TM 94-069) dated February 1946. The S-72 multiband portable of the late '40s has a circuit similar in many ways to those of its predecessors.

I have restored the S-29 and two S-39s. All needed re-capping; two required new leather handles. To circumvent the S-29's power-line problem, a 117Z6 was substituted for the 50Y6, eliminating one dropping resistor. Its current rating is not quite equal to the radio drain but it seems to perform well. No other engineering changes were necessary.

The radios perform admirably - calibration is right on for all shortwave bands - with only a 5-10 kHz frequency squegging on the upper half of the broadcast band. All in all, a beautiful example of solid portable construction of the '40s era. Evolution seems to make things better while time marches on.