
The 5-T Hallicrafters Sky Buddy and All Other Sky Buddy Models

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Abstract

Although Hallicrafters made innumerable radios and other electronic products over many years, the Sky Buddy stands out as an early and important series highly prized by collectors. The fact that the first Sky Buddy, the 5-T, had a boy depicted on the celluloid dial is especially intriguing and attractive to collectors. If one includes the Sky Buddy II, the Sky Buddy name lasted over 25 years. This article includes information on restoration of the 5-T Sky Buddy tuning mechanism and comparative information on the 5-T, S-19, S-19R, and S-119 receivers, thus the entire Sky Buddy series.

Introduction

This article will cover both versions of the Hallicrafters famous 5-T Sky Buddy, and the other Hallicrafters models using the Sky Buddy name: the S-19, the S-19R, and the S-119. The dial face of the earliest 5-T Sky Buddy is unusual as it pictures a boy wearing headphones. On the later 5-T models, there is no boy. Throughout this article, to distinguish the two variations, the terms “5-T With Boy” and “5-T Without Boy” will be used.

At the outset, the name Hallicrafters has been revered by the amateur radio community since the late 1920s, by the military, especially during WWII, and by radio enthusiasts everywhere. In his wonderful books, Chuck Dachis (Ref. 1, p. 8–9), has presented a history of Hallicrafters that need not be repeated here. Suffice it to say that the

work of Chuck Dachis and an earlier book by Max de Henseler (Ref. 2) cover much of what is known about Hallicrafters. The excellent details on radio restoration by Chuck Dachis (Ref. 1, p. 19–20) are really great concepts for the restorer. Chuck has stated that “I will sometimes purchase as many as five radios of the same or similar model to get enough parts to restore one” (Ref. 1, p. 19). In the case of the 5-T Sky Buddy, I have certainly found that to be the case. Several sets had good parts made but extra holes in the panel for send/receive switches, magic eye tuner tubes, pilot lights and the like. One of the most daunting aspects of the restoration of the 5-T Sky Buddy was to replace the belt-type tuning cable buried in the mechanism. I have found that this is the most difficult compared to circuit

The 5-T Hallicrafters Sky Buddy

problems. A special section in this article covers that issue. Surprisingly, the proper cable can still be found, occasionally, on eBay. Another important area is the differences, other than the dial, between the 5-T With Boy and the 5-T Without Boy. For completeness, the rest of the Sky Buddy series, the S-19, the S-19R, and the S-119 Sky Buddy II will also be covered.

The Hallicrafters 5-T Sky Buddy With and Without Boy

The initial production run of 5-T Sky Buddy (1935–1936) had a dial showing a boy sitting at a desk wearing headphones with his right hand on a telegraph key (Fig. 1). This was artwork incorporated into the celluloid dial. The name Sky Buddy appeared only in the upper left hand corner of the radio's front panel. According to Chuck Dachis (Ref. 1, p. 21), legend has it that Bill Halligans' neighbor had a youngster,

Buddy, who was a radio enthusiast unable to afford an expensive commercial set. Bill had an introductory radio priced at \$29.50 made and called it the Sky Buddy in the boy's honor. Since Hallicrafters did not have a license to use RCA patents at the time, it is felt that the production of the Sky Buddy With Boy was made by the Howard Radio Company, which did have such a license (Ref. 1, p. 21).

According to the Sky Buddy Model 5-T Operating Instructions, the three band receiver frequencies are:

No. 1 Band – 545 KHz to 1680 KHz

No. 2 Band – 1680 KHz to 5.5 MHz

No. 3 Band – 5.5 MHz to 16 MHz.

Since the next version (1936–1937) of the 5-T used a different tuning mechanism and had changes in the dial, it suggests that they were made entirely by the Hallicrafters and not Howard,



Fig.1. Hallicrafters 5-T Sky Buddy With Boy.

and sold at the same price of \$29.50. It was available “on-time” at \$2.50 per month. These had the boy replaced by a more colorful dial with the words “SKY

BUDDY by the Hallicrafters” (Fig. 2). As far as I can tell, the schematic (Fig. 3) but not all the components such as the tuning unit, are the same.



Fig. 2. Hallicrafters 5-T Sky Buddy Without Boy.

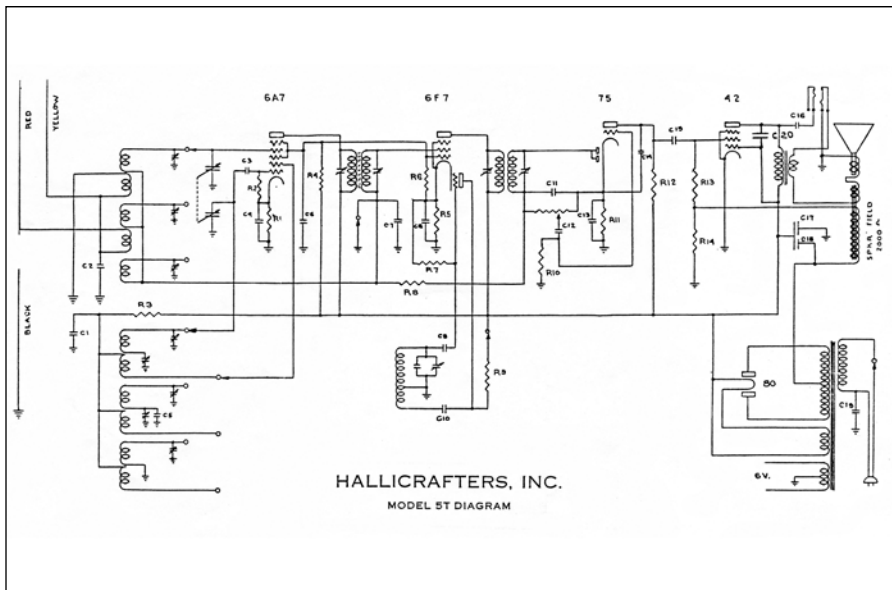


Fig. 3. Schematic of 5-T (see Ref. 7).

Restoration of the Hallicrafters 5-T Sky Buddy Models

At first glance, the two versions of the 5-T may look the same except for the celluloid dial, one with a boy and one without (Fig. 4). However, as will be explained later, the tuning changes go beyond a simple replacement of one dial for another.

When I saw my first 5-T With Boy I was intrigued by its appearance. I missed out on one at an AWA Conference auction and later I saw one exhibited by my friend William Ross at a Radiofest Conference in Illinois. I searched eBay to no avail, so I advertised in the Antique Radio Classifieds for six months without success. Then one came up on eBay and I bought it even though its panel was defaced and it was expensive. In order to get enough 5-T's to restore a 5-T With Boy and a 5-T Without Boy I ended up buying six 5-T's. Most were defaced or incomplete in one way or another. When a

rare item does well on eBay, in my experience, others soon follow, at least for a while. It seemed I bought every one and then the supply dried up. As previously mentioned, Chuck Dachis, in his excellent book on Hallicrafters, states "Although somewhat costly, I will sometimes purchase as many as five radios of the same or similar model to get enough parts to restore one" (Ref. 1, p. 19). I have certainly found that to be true for the 5-T, especially since the models with and without the boy are different in a number of respects. The major problems I have encountered are defacing of the front panel, broken or missing dial belts, and, in 5-T's With Boy, missing belt tension idlers. When I find one with a near-perfect panel, then I do the restoration. The other sets provide missing or replacement parts.

The most common problem was an added send/receive switch installed on the front panel since the 5-T never had such a switch, an added pilot light, an



Fig. 4. Comparison of the 5-T Celluloid Dial With Boy and the one Without Boy showing on the dial. "SKY-BUDDY by The Hallicrafters". See back cover for color. The small red pointer is the 36 to 1 bandspread dial for the 0-100 outer ring of the dial. The longer beige colored pointer is to show frequency, the upper pointer for Band 1 and 3, the lower portion for Band 2.

added tuning eye, open or filled holes on the panel, and a “Boy” dial on a “Non-Boy” 5-T. Of course, several had a missing dial belt replaced by dial string in an attempt to replace one that had broken or worn out over time (Fig. 5). I am still able to pick up the proper dial belt (Fig. 6), the General Radio #116, on eBay or at radio flea markets.

Once you recognize that you cannot use parts from a 5-T celluloid dial Without Boy to repair a 5-T With Boy with damaged or missing parts, the major problem is replacement of the dial belt in the 5-T With Boy, which is usually broken or gone. It is a daunting task if you want to do it right since it requires disassembly of the dial assembly, including the dial glass, pointers, celluloid dial, and various other parts to reach the belt and replace it. For the 5-T With Boy, if the tension idler is missing you must first search for a replacement. Replacement of the dial belt is a laborious but satisfying process

as outlined in Table I. For those who want to know more about replacing dial belts and making your own, there have been a number of papers in *Radio Age* over the years which may preclude the necessity to disassemble the tuner dial assembly if the proper dial belt cannot be found (see Ref. 3, 4 and 5).

The tubes (same in both versions) used in the 5-T Sky Buddy, from the Manual (Ref. 3) are as follows:

1st Detector-Mixer: 6A7
 Beat Oscillator - IF Amplifier: 6F7
 Diode Detector - AVC - Audio Amplifier: 75
 Audio Power Output Stage: 42
 Rectifier: 80.

The earliest 5-T With Boy has tabs incorporated on the metal ring holding the celluloid dial. They are frequently replaced with soldered metal tags since they break easily (Fig. 6). The beige colored pointer is held on



Fig. 5. Close up of the 5-T With Boy Sky Buddy tuning mechanism showing handmade string belt to replace the original belt. Also shown is the idler/tensioner under the string belt. Such string belts were used mainly to avoid the complex disassembly needed to replace the proper belt. Also shown is a soldered-on tab to replace one damaged in the past.



Fig. 6. Properly installed General Cement No. 116 Belt in a 5-T With Boy Chassis. Note glass, dial and hands have been removed and the soldered tabs bent out to facilitate removal of these parts. One of the tabs had broken in the past and was replaced.

TABLE I
Replacement of Dial Belt in a 5-T Hallicrafters Sky Buddy

(Based on experience of the author)

1. Remove 11 screws holding case to 5-T.
2. Remove nut holding the AVC switch.
3. Remove the following knobs: main tuning, band switch and volume control.
4. Remove four screws in bottom of 5-T holding chassis in place
5. Remove screw holding the two shielded wires going to BFO pitch control unit.
6. Rotate chassis carefully away from front panel to give access to belt.
7. Be sure you have a General Cement #116 Belt in hand or equivalent.
8. Bend small tabs away holding the convex dial glass. If you break a tab you can solder a replacement at the edge to hold the glass.
9. Remove the dial glass trying not to damage the dial seal on the edge. You will need it later to hold the celluloid dial in place.
10. Remove the main tuning indicator. In the 5-T With Boy it is held with a compression fit. In later versions (without a boy) it is held with a small screw.
11. Remove the red pointer being careful not to distort its fitting.
12. Under the red pointer is a washer which holds the pointer away from the celluloid dial. Retain this washer.
13. Gently remove the celluloid dial and set it aside.
14. Blow out or vacuum any dust or debris in the gears.
15. Now is a good time to check the dial bulbs to be sure they are good.
16. Remove the dial assembly by removing four screws on the right side and two on the left side for the 5-T With Boy.
17. Remove the one screw holding the main tuning stem bracket.
18. The belt can now be installed. 5-T's With Boy have an idler held in place by the belt. If this is missing, the belt may slip. The later 5-T Without Boy has a captive idler and a different gear arrangement.
19. Reassemble by doing the reverse of the above. Be sure the celluloid dial is properly oriented. Be sure the mechanism works smoothly.
20. Clean the dial glass and install by bending the clips at the edges.
21. Test the radio before reinstalling on chassis. Now is the time to check components, lubricate band switch, and check alignment.

with a push-on compression of a small diameter element from the condenser tuning mechanism (Fig. 7). The belt is held in tension by an idler on a flat tension spring arrangement. When the belt breaks after a time, the idler becomes loose and is frequently lost.

The later 5-T Without Boy also has tabs integrated into the metal ring holding the dial. The beige colored pointer is held in place with a small flat-headed screw while in the 5-T With Boy it is a pressed-on fit. The earlier celluloid dial with boy will fit in this later housing but would then not be original. The belt is the same as in the earlier 5-T, i.e. a General Cement #116 or a #119. The tension idler in the 5-T Without Boy is on a wire arm as part of a special

tension spring (Fig. 8). If the belt breaks, the idler is still captured. The 5-T has a 36-1 gear ratio (Ref. 2).

The gear mechanisms looks the same but are different. The gears on the later version, without the boy, are held in place differently. Also, close inspection of the celluloid dials will reveal differences in the dial calibration for the three bands. Therefore, if one has a good celluloid dial with a boy in a defaced panel, it cannot simply be placed in the chassis of a later version with a good panel since the calibration will be off. I do not believe it would be possible to change the entire condenser and dial unit since the mounting holes are different even though the panel, case and many other circuit elements are similar.



Fig. 7. Parts of the 5-T With Boy: dial, dial glass, seal, celluloid dial, red pointer, washer and beige press-on pointer. The 5-T Without Boy has a similar dial with slightly different calibration, a larger hole in the red pointer and a beige pointer held in place with a screw.

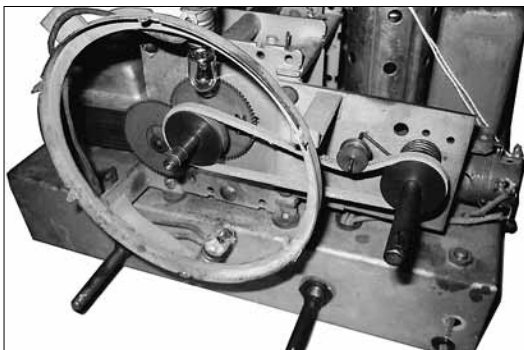


Fig. 8. 5-T Without Boy Chassis showing the captive idler/tensioner. The dial hands have been removed as have the mechanism covers.

Hallicrafters S-19 AND S-19R Sky Buddy Receivers

The S-19 (1938) and the S-19R Sky Buddy (1939) receivers (Fig. 9, 10 and 11) in most ways are two completely different receivers. They both look the same with black crinkle finish, the same size (17½” wide, 8¾” deep and 8⅝” high), and a speaker grill on the right side of the panel with a lower case “h” on the grill. Most other characteristics are different, as shown in Table II. Marc Ellis has described the Sky Buddy early series and restoration of an S-19R (Ref. 6).

Some of the tubes are the same and some are not (see Table III). The S-19 Sky Buddy had a frequency range of broadcast band to 18.5 MHz in three

bands which did not include the popular 10-meter band. The S-19R Sky Buddy had a fourth band with a tuning range of 16 to 44 MHz well beyond that needed for ten-meters.

Marc Ellis has combined several articles in his *Popular Electronics* “Antique Radio” column into a single 28 page pamphlet “The Sky Buddy Saga” which discussed the 5-T (Ref. 6, p. 4), the S-19 and the S-19R (Ref. 6, p. 5). In his pamphlet Marc describes in detail restoration of an S-19R Sky Buddy (Ref. 6, p. 6–22). Marc found that it was necessary to remove the main tuning bandspread subchassis (an arduous task to remove and replace) (Ref. 6, p. 16) to gain access to the dial

TABLE II Comparisons of the Sky Buddy S-19 and S-19R	
S-19	360° Silver dial with engraved lettering One main tuning knob, 2nd dial is a logging scale. Phone jack on left. 3 bands. Broadcast band to 18.5 MHz. 5 tubes. 465 KHz IF. Send/Receive switch on right side of panel
S-19R	Major changes in dial: Somewhat over 180°, silkscreened lettering. Main tuning knob and a second bandspread tuning knob. Phone jack on right. 4 bands. Broadcast band to 44 MHz (includes 10 meter band). 6 tubes. 455 KHz IF (made standard by industry). Send/Receive switch on the left side of panel. Early version: Three slide switches on panel. Used 6Q7 and 6K7 tubes. Late version: Two slide switches and one toggle switch (the Send/Receive). 6SK7 tube used in place of the 6K7, and a 6SQ7 used in place of the 6Q7.



Fig. 9. Hallcrafters S-19 Sky Buddy.



Fig. 10. Early Version of Hallcrafters S-19R Sky Buddy. All switches are slide type.



Fig. 11. Later Version of Hallcrafters S-19R Sky Buddy with send/receive toggle switch.

TABLE III <i>Tubes Used in the Sky Buddy S-19 and S-19R</i>		
Function	S-19 ¹	S-19R ¹
1st Detector-Mixer	6K8	6K8
IF Amplifier	6P7 (late 6L7)	6KL (late 6SK7)
Diode Detector, AVC, Audio Amplifier	6Q7 or 6SQ7	6Q7 (late 6SQ7)
Audio Output Stage	6K5 or 6K6	41
Rectifier	80	80
Beat Frequency Oscillator (BFO)	---	76

(1) Source: Operating Instructions for Sky Buddy S-19 (Ref. 8) and S-19R (Ref. 9).

drive system and to replace the shock-absorbing grommets which had hardened with age (Ref. 6, p. 13).

The schematic for the S-19 is shown in Figure 13 and for the S-19R in Figures 14–16. The separate bandspread on the S-19R is somewhat unique in that a small condenser is electrically part of the main tuning condenser including the stator with a separate rotor section, much smaller than the main condenser but an integral part of it, driven by a gearless mechanism, a dial string, with

an entirely separate bandspread tuning knob. Early (Fig. 10) and late (Fig. 11) versions of the S-19R were made. Figure 12 shows a comparison of the S-19 and S-19R dials. Table II compares the S-19 and S-19R early and late versions. Figure 13 shows a schematic of the S-19 without external battery connections (octal plug in rear panel) and the same for the S-19R is shown in Figure 14. Figure 15 shows the schematic of the S-19R with external battery provisions and Figure 16 shows the connections for the

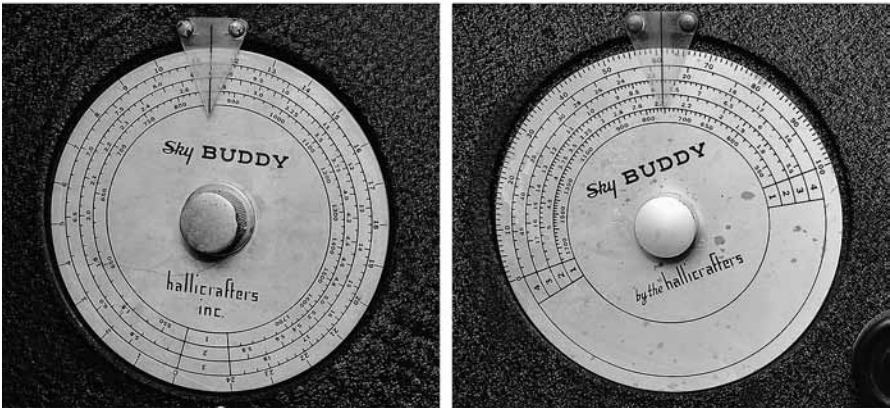


Fig. 12. Comparison of the S-19 and S-19R Dials.

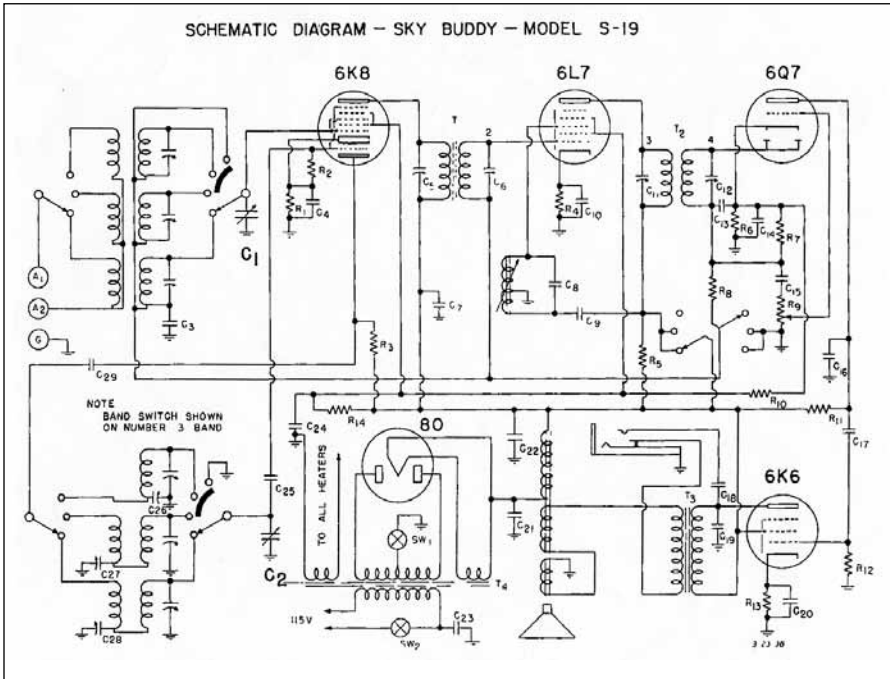


Fig. 13. Schematic of S-19. Battery connections not shown. (See Ref. 8).

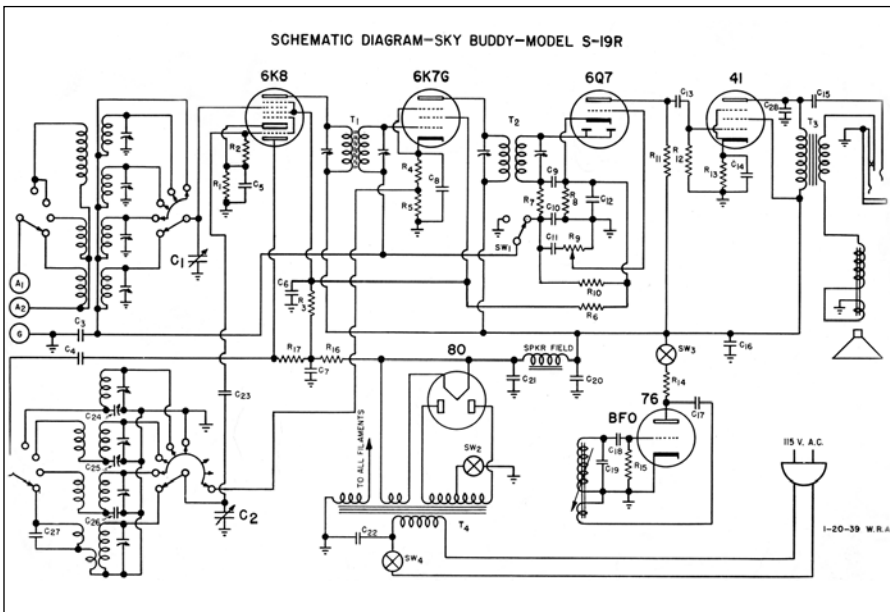


Fig. 14. Schematic of S-19R. Battery connections not shown. (See Ref. 9).

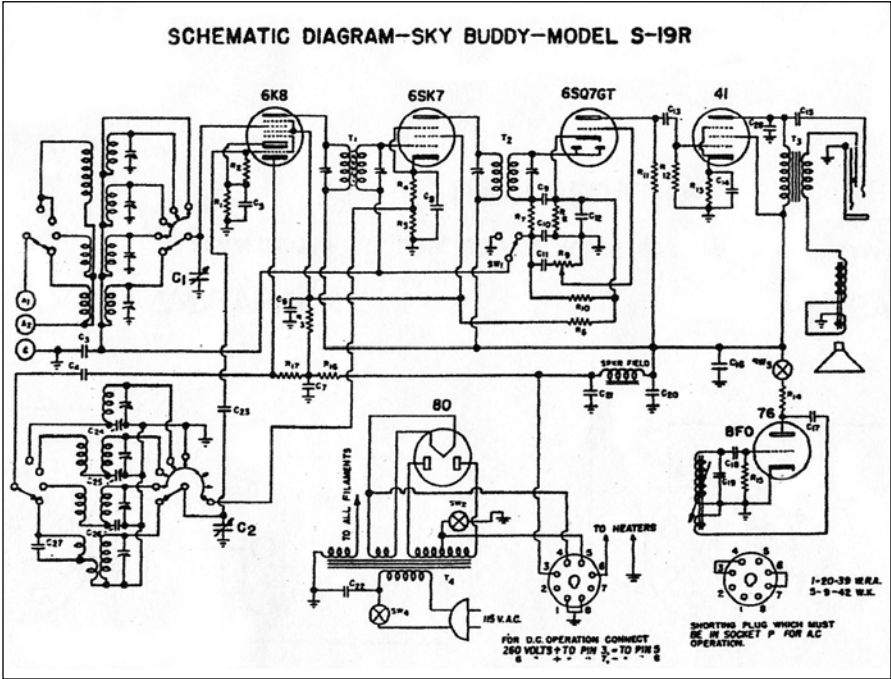


Fig. 15. Schematic for S-19R showing external battery connections.

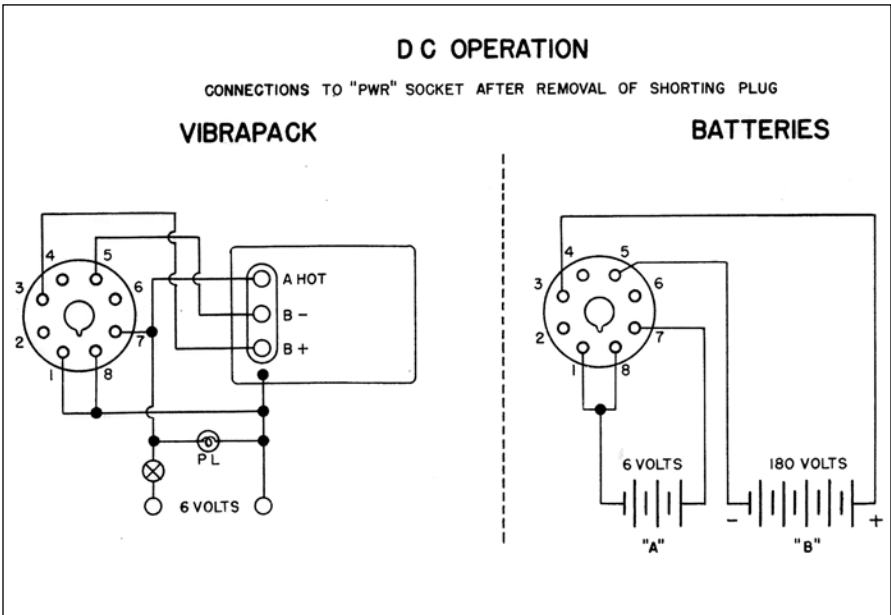


Fig. 16. Connections for Battery or Vibrapack Power Supply (see Ref. 9).

external battery and Vibrapack power supply. Both my S-19 and S-19R receivers had the actual female socket on the back chassis. Of the two, the S-19 is very rare and the S-19R less rare because many more were manufactured. Both were priced at \$29.50 (Ref. 1, p. 36).

As shown in Table III, both the S-19 and the S-19R had some tubes which changed over time. The S-19 used a 6F7 (later a 6L7) as a dual function tube whereas the S-19R had a 6K7 (later a 6SK7) as an IF amplifier only. The S-19R used a separate tube for its BFO, a type 76.

Hallicrafters S-119 Sky Buddy II and Kit Form M S-119K

The S-119 Sky Buddy II was introduced in 1961 fully assembled and in kit form in the S-119K. It sold for \$39.95 in kit

form or for \$49.95 fully assembled. The S-119 was the hundredth model since the S-19 Sky Buddy (Reference 1, page 21). The receiver (Figure 17) had three bands covering 535 KHz to 16.4 MHz and a 455 KHz IF. It had a ferrite rod antenna for the broadcast band. The dial is somewhat similar to that found in the S-19.

The S-119 is transformer operated and has a selenium rectifier. It used three tubes: 6BE6 Oscillator-Mixer, 6BA6 IF and BFO, and 6CM8 1st Audio and Audio Output. It used an IN295 Silicon Diode in the 2nd IF. See schematic (Fig. 18 and Ref. 10).

The S-119 was the only receiver since 1939 to use the name Sky Buddy (hence Sky Buddy II) and it was the last. It did not sell well and therefore is rare today, especially in good condition.



Fig. 17. Hallicrafters S-119 Sky Buddy II.

The 5-T Hallicrafters Sky Buddy

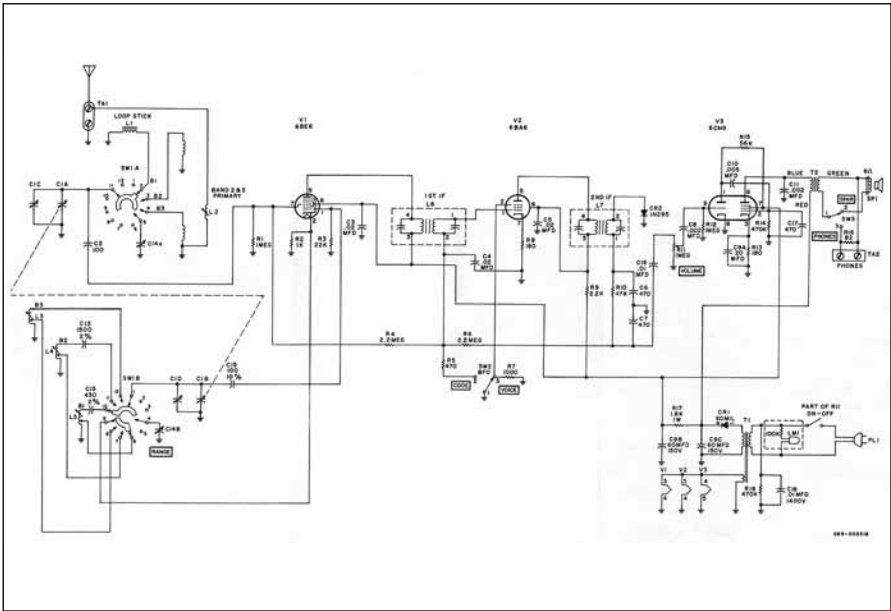


Fig. 18. Schematic of S-119 Sky Buddy II (see Ref. 10).

Conclusion

So ended the wonderful Sky Buddy receiver series which stands as one of the most attractive, well liked and very functional early Hallicrafters receivers.

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Photo Credits

All items shown in the Figures, including the rare 5-T With Boy, are in the collection of the author. All photos were done by Susan E. Golebiowski.

About the Author

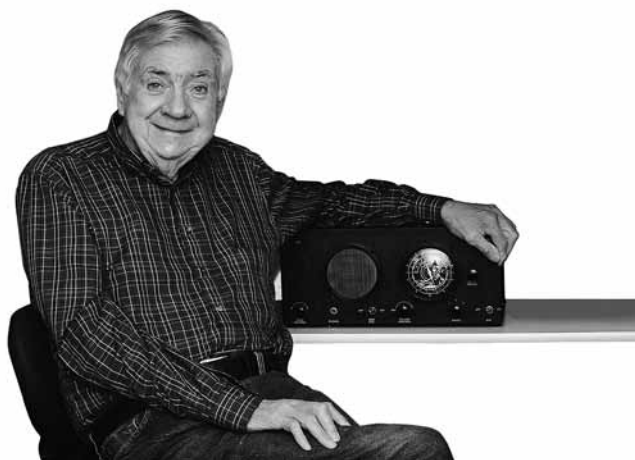
Born on a ranch in South Dakota, U.S.A., without electricity except for batteries and no indoor facilities, radio was an important contact with the world for him. A current holder of the Extra Class amateur radio license, **Erich E. Brueschke**, BSEE, M.D., FAAFP, KC9ACE held the call WΦBPS in high school in 1948. After graduating from the South Dakota School of Mines and Technology with a B.S. in Electrical Engineering, he went on to work for the Hughes Research and Development Laboratories in Culver City, California, for five years. There he specialized in magnetics and the effects of high vacuum on components. His last work there focused on the Surveyor spacecraft in 1961–1962, which

landed on the moon in 1966. He left Hughes to attend medical school at Temple University School of Medicine in Philadelphia, Pennsylvania. After completing his medical training, he became a Captain in the United States Air Force at the Aerospace Medical Research Laboratories at Wright-Patterson Air Force Base in Dayton, Ohio. Subsequently he practiced family medicine in California and then joined the Illinois Institute of Technology Research Institute in Chicago, Illinois, where, as Director of Medical Engineering Research, he worked on artificial internal organs, including powering the artificial heart, for seven years. He then joined Rush Medical College in Chicago, where he was Chairman of Family Medicine, and Professor of Physiology and Molecular Biophysics. He was also Program Director for the Rush-Christ Family Practice Residency Program for 17 years, which trained over 100 family physicians. He subsequently became Dean of Rush Medical College for six years. He retired as Dean in 2000. He is currently the Distinguished Professor of Medicine at Rush Medical College at Rush University in Chicago. He has two patents issued and has published numerous papers in engineering, medical and scientific literature, and is a member of a number of professional societies. He has previously published in the *AWA Review* in 2010, 2012, and 2013. His major collecting and restoration interests are early scientific educational apparatus, crystal sets, early battery radios, Heathkits, and

The 5-T Hallicrafters Sky Buddy

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