

Classic Radio

Amateur Radio Equipment with a Hot Chassis

Most equipment marketed to amateur radio operators in the mid-1900s used power transformers to provide isolation between the radio chassis and the ac power line. But some companies that were trying to keep the cost of their products as low as possible used a design where the internal power supply was not isolated from the incoming ac power line, and no isolating power transformer was used, a design that results in a “hot chassis.”

Popular Receivers

Hallicrafters

Hallicrafters made a number of shortwave receivers using hot chassis, allowing them to be used from commercial power sources that might be dc or 25 Hz. The famous, relatively low-cost S-38 family of Hallicrafters receivers were very popular, as they were the first receivers from 1946 to 1961 to become used receivers.

The S-38 series was the first receiver for many new amateurs of the 1950s and 1960s. In 1946, the S-38 model was made with six octal tubes. Later that year, the S-38A was made with five tubes by using oscillation in the IF amplifier in place of a separate beat frequency oscillator (BFO) tube. In 1957, the S-38E receiver was made with five miniature tubes and soon offered wood-grain cabinets. All S-38 models had an internal loudspeaker. The S-38 was in the Hallicrafters’ product line from 1946 to 1961, ranging from \$39.50 to \$59.95.



The Hallicrafters S-38 series of receivers were very popular in the 1950s and 1960s, and the S-38 was in the Hallicrafters’ product line from 1946 to 1961. [Photo courtesy of www.radiopics.com]

The 1938 S-22 receiver, which aimed to provide marine coverage, used eight tubes and an ac- and dc-power design with an internal speaker for \$64.50 until 1946. In 1940, the portable S-29 Sky Traveler was battery-operated and also used an ac- and dc-power design, but with nine tubes, for \$59.50 — it also had an internal whip antenna and a speaker. The 1945 S-39 Sky Ranger was the next generation of the S-29 and had the same features. The 1946 S-41 Skyrider Jr. used an ac- and dc-power design with an internal speaker and six octal tubes — it was based on the Echophone EC-1. The 1947 S-51 Seafarer was also aimed at marine radio frequencies and used an ac-power design. This model had no band-spread dial calibrations and had an internal speaker.

The S-52 receiver was similar to the S-51, but it offered general coverage (0.54 – 43 MHz), used eight tubes and an ac- and dc-power design, and had an internal speaker and an amateur radio bandspread dial. The S-72 was a battery-operated portable receiver that used ac or dc power and had an internal speaker. In 1950, Hallicrafters made an ac- and dc-powered version of the S-40B, which had an internal speaker and an amateur radio bandspread dial, and it used eight octal tubes to cover 0.54 – 43 MHz — this version was \$99.50. In 1954, Hallicrafters updated their portable receiver with the portable S-93, which used ac and dc power, was battery-operated, had low frequency coverage of 170 – 400 kHz (plus 0.54 – 18 MHz), and had an internal AM broadcast antenna and a whip antenna. In 1961, the S-118 and S-120 used miniature tubes, and each had an internal AM broadcast antenna and a speaker. The S-118 had coverage below the AM broadcast band. In 1965, Hallicrafters made the S-200 Legionnaire AM broadcast receiver that covered four shortwave bands with bandspread. In 1969, the S-210 added the FM broadcast band to the S-200.

National Radio Company, Heathkit, and Others

National Radio Company made only a few models of ac- and dc-powered receivers. These receivers all used miniature tubes except for the 1950 SW-54, which used a 35Z5 rectifier tube. All the receivers covered 0.54 –



The 1950 SW-54 was one of the few models of ac- and dc-powered receivers made by National. [Photo courtesy of www.radiopics.com]

30 MHz and included an AM broadcast band antenna, plus an internal speaker. The SW-54 was very popular, as was the NC-60 Special. The NC-66 was an ac- and dc-powered and battery-operated receiver that covered 150 – 400 kHz and 0.50 – 23 MHz; it had an AM and low-frequency loop antenna and a whip antenna. The NC-77X covered 0.54 – 31 MHz and had an internal AM broadcast band antenna, plus an internal speaker.

Heathkit made all of their kit receivers with a power transformer, which made the sets safer to work with than hot chassis sets like the Hallicrafters S-38 and S-120, or National SW-54 and NC-60 Special. Even Heathkit's GR-81 and GR-91 receiver kits used power transformers, although they used tube types, like the 50C5 audio output tube, that were usually used in inexpensive AM receivers. Heathkit even advertised that their receivers used a power transformer to make them more shock-free.

Collins Radio, Hammarlund, and Radio Manufacturing Engineers (RME) never made any radios using a hot chassis.

Transmitters and Transceivers

In the 1950s, World Radio Laboratories (WRL) put out an 80-meter CW transmitter with a power transformer, using two tubes whose filaments were lit directly off the 117 V ac power line. This transmitter, known as CW-7, sold for \$21.45. Caution must be taken when using this low-cost transmitter, especially if used with a receiver like a Hallicrafters S-38 or National NC-60, as they also use a chassis with one side of the ac power line connected to the common ground.

The Sideband Engineers (SBE) SB-33 transceiver had an internal power supply for the vacuum-tube circuitry that was connected to the ac line, but the SB-33 had a rear panel light to ensure that the common side of the power supply and the side of the ac line used was the neutral side, minimizing the shock and ac hum possibilities. The ac line bundles never connected to the chassis common ground. The negative side of the power-supply circuitry was connected to the chassis common ground by capacitors with very low reactance at RF, but high reactance at 60 Hz, so the chassis wasn't a shock hazard. The tube filaments and the low-voltage power supply to operate the solid-state circuitry were operated by an internal power supply. In modern times, the user of an SB-33 can put a three-wire power cord on the unit, ensuring the unit is plugged in correctly whenever the three-wire cord is plugged into a properly wired ac socket. The very similar-looking SB-34 uses a transformer for isolation of the ac line, so it's always safe regardless of how the ac plug is inserted.

The 80- and 40-meter CW transmitter from Ameco sold for \$16.95, used a power transformer, and was safe to set up and use.

Feedback

In the August 2022 "Technical Correspondence" column, in the second paragraph of the item, "Improved Wide-Range Audio Oscillator," the final sentence of that paragraph should read, "For the Wien bridge segment, I used a dual 10 k Ω potentiometer with 820 Ω series resistors."

Strays

QST Congratulates...

■ Spurgeon "Spud" Roscoe, VE1BC, on the publication of his book, *Radio History: Amateur Radio*, which recounts Canadian radio history with a special emphasis on the Halifax Amateur Radio Club (HARC). The book is available from www.amazon.com in hard- or softcover.

■ George J. Whalen, NY9A, on the publication of the second edition of his book, *The Story of Radio: to 5G Wireless*, which recounts the history of radio technology through "Radio Heroes." The book is available from www.amazon.com for Kindle and in hard- or softcover.