

## Classic Radio

# The Drake 4-Line Family

Several amateur radio equipment retailers, including Drake, set out to duplicate the popular Collins S-Line, which became available in 1958. In 1959 and 1961, Drake released two excellent and popular receivers — the Drake 2-A and the 2-B, respectively. Both receivers were joined by accessory speakers, a 100 kHz crystal calibrator, a 2 LF low-frequency converter, and the 2-AQ and 2-BQ speaker and Q-multiplier combination. In 1963, Drake started building the 4-Line family of separates (see Figure 1) in response to Heathkit's release of their SB-Line.

### Drake Introduces the 1-A, 2-B, and TR-3

Starting in 1963, Drake created popular transceivers with the model TR-3 featuring SSB, CW, and AM operation for 80/75, 40, 20, 15, and 10 meters. In 1964, Drake introduced the model TR-4. The 2-B went on as a new product until 1965 and was followed by the model 2-C, which used the same accessories as the 2-A and 2-B, except for the 2-CS speaker and 2-CQ speaker/Q multiplier revised to match the styling and knobs of the 2-C. The 2-C and matching 2-NT CW transmitter was popular in stations for Novice-class licensees.

### Drake Emulates the Collins S-Line

The Drake R-4 receiver became available in 1964 and added a built-in calibrator and many other features to the 2-B. The R-4 and 2-B were physically very different. Coverage of 160 meters was built in, except for a single 12.6 MHz plug-in crystal to enable the coverage. Only 28.5 to 29 MHz was included for 10 meters. Three optional crystals were required to cover the rest of 10 meters. Coverage of 80/75 to 15 meters (it was too early for WARC bands) was included in the 500 kHz bands.

Selectivity was provided by Drake's famous and well-liked passband tuning system introduced in the last intermediate frequency (IF) of 50 kHz, except on the R-4C. The R-4, R-4A from 1966 (see Figures 1 and 2), R-4B from 1967 (see Figure 3), and R-4C from 1973 were mixed receivers, employing both vacuum tubes and solid-state devices. They became more solid state

as time went on. In 1964, the R-4 used 13 tubes and a few semiconductors. Two years later, in 1966, the R-4A had a reported 12 tubes (but I count 13). By 1967, the R-4B was down to 10 tubes, and in 1978, the well-respected R-4C was down to six tubes.

In 1978, the fully solid-state R-7 receiver came out, replacing the R-4C in a bit over a year. There was a solid-state TR-7 80/75- to 10-meter SSB-CW transceiver and an L7 linear amplifier joined by a single 3-500Z final amplifier tube L-75 linear, but there was no T-7 transmitter to go with the R-7 receiver. The era of the receiver and transmitter transceiving pair was ending with the growth of solid-state transceivers at Swan, Drake, Astro, and the first generation of Atlas transceivers.

Like the Collins S-Line and Heathkit SB-Line, all Drake 4-Line receivers would transceive with all 4-Line transmitters. This was not true of the two Hallicrafters transceiver pairs — the SX-117 and HT-44, and the SX-146 and HT-46.

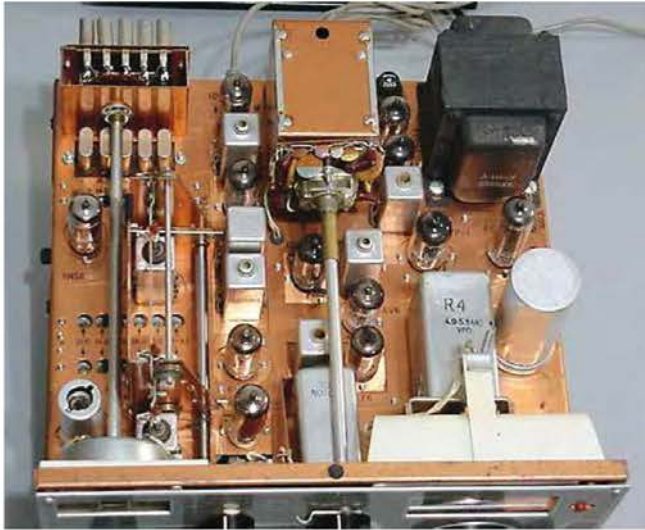
### The R-4C

The earlier R-4, R-4A, and R-4B receivers were quite similar to each other, with only evolutionary changes. They were all double conversion with a 5.645 MHz first IF and 50 kHz second IF. The Drake R-4C was quite different. It was considered a triple-conversion design, which affected the passband tuning. The first conversion was to the 5.645 MHz by the tuning the VFO and the crystals that define the band to be tuned. There was an



**Figure 1** — Drake's R-4A receiver. [Ronald Baker, WB4HFN, photo]





**Figure 2** — The top, inside view of the Drake R-4A receiver. [Ronald Baker, WB4HFN, photo]



**Figure 3** — The Drake R-4B. [Ronald Baker, WB4HFN, photo]

8 kHz crystal lattice filter to restrict the bit of spectrum coming in. The second conversion was to 5.695 MHz (5695 kHz), using the BFO as the conversion oscillator. The BFO frequency is about 50 kHz, plus or minus about 5 kHz. The third conversion was via a crystal oscillator at 5745 kHz down to the 50.0 MHz. The 50 MHz last IF was characteristic of Drake radios.

The R-4C also offered crystal lattice filters for selectivity. The 5645 kHz IF offered only 8 kHz, and the receiver comes with a 2.4 kHz crystal lattice filter. The optional crystal lattice filters were in the second IF at 5695 kHz. Optional filters had bandwidths of 6, 1.2, and 0.5 kHz, and 250 Hz was offered for sharp CW service.

The front-panel control adjusts the BFO. Shifting the BFO frequency affected the receive frequency slightly and also shifted the position of the BFO relative to the signal to be demodulated by the product detector. The net effect was that the received signal and demodulation both shifted relative to the frequency of the crystal lattice filter, creating very smooth and effective pass-band tuning about the selected IF filter.

## 4-Line Compatible Units

Drake marketed several accessories for the Drake 4-Line receivers in addition to the crystals to add band coverage and the crystal lattice filters. The MS-4 matching speaker also housed the AC-4 power supply for the transmitter or transceiver for use with the 4-Line receivers, the 4-NB noise blanker, and the FS-4 frequency synthesizer that replaced all optional crystals, giving the R-4 receivers coverage from 1.5 to 30 MHz (except 5 to 6 MHz) and the T-4 or T-4X family of transmitters to transceive or operate separately from the receiver.

The available transmitters included the T-4, T-4B, and T-4C reciters with no VFO that would only transceive with the 4-Line receivers, the T-4X, T-4XB, and T-4XC transmitters with internal VFOs, so they could transceive or operate on separate frequencies. The receiving converters covered 6 and 2 meters, and the TC-6 and TC-2 transmitting converters helped to put the 4-Line on 6 and 2 meters. The MN-2000 high-power and MN-4 200 W antenna tuners also matched the 4-Line. The C-4 station console complemented the 4-Line styling, colors, and knobs, and the L-4 and L-4B linear amplifiers paired with the other equipment.

## End of an Era

Most of the Drake 4-Line equipment was available until 1979, when the solid-state TR-7 80/75- to 10-meter transceiver and the R-7 solid-state receiver were available. By 1980, the reign of separate transmitters and receivers was over for new equipment from manufacturers, including Drake, Swan, Heathkit, Collins, Kenwood, Yaesu, and KW Electronics of England. The SSB-CW transceiver invented by Collins in 1957 and brought down in price by SBE, Drake, Hallicrafters, Swan, Galaxy, and others in England and Japan completely took over the amateur radio market by 1985.