

COLLINS KWM-1: THE RADIO THAT CHANGED COMMUNICATIONS

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In 1957 the Collins Radio Company introduced a new mobile rig without realizing that it would revolutionize communications. One reviewer from QST, recognizing a new and important concept in ham gear, commented (April 1958, p. 23): "it is the writer's opinion that the KWM-1 may well mark the end of one era and the beginning of another. This unit is more than a piece of ham gear; it could be a way of life (in amateur radio)."

Collins pitched this unit primarily as an extra piece of equipment suitable for mobile operation. It was a multiband single-sideband (SSB) and CW transceiver with 200 watts PEP input, smaller than a briefcase, that weighed only 15 lbs. Does this sound like the average rig of today? The KWM-1, a clever combination of technical innovations built into a single unit, was the first modern amateur radio. Your Kenwood, Yaesu, and ICOM are all descendants of this neatly built little box. The KWM-1 transceiver combined so many innovations in one package that it is no exaggeration to state that every transceiver operating today in amateur and commercial service is a descendant of this fine piece of equipment.

Collins shattered ham radio's version of "equipment machismo," which mandated that you had to run a 1000-lb rack-mounted monster to really pack a signal on the air.

Though the astute reviewer foresaw the revolution in equipment design that the KWM-1 would cause, Collins itself did not understand the implications and marketed it primarily as an accessory unit for mobile operation! Amazingly, they started a revolution in compact base-station equipment but promoted the gear for a much different use.

SIDE BAND

In the early 1950s Collins launched a campaign to sell SSB equipment. Other manufacturers soon followed with their own lines of SSB gear. SSB, unlike AM, filters out one sideband and the carrier, leaving the minimum signal that still carries all the intelligence. This concept was well known to amateurs, and experimental sets were built as early as the 1930s. (See George Grammer, "Single Sideband in the Amateur Service," Proceedings of the IRE, December 1956, pp. 1829-1833.) Despite the efficiency and readability of SSB signals, the idea did not catch on until the early 1950s.

Many hams were in positions to influence communications purchasing decisions for commercial users. Some observers believe that

Collins marketed SSB amateur equipment as an indirect way to reach these people during their recreational hours.

Collins sideband equipment before the KWM-1 incorporated some important innovations. These included a mechanical filter in the IF for sharper selectivity. Low intermediate frequencies with conventional tuned circuits gave good selectivity that was fine for CW, but the response curve was rounded and produced distortion of voice signals. Mechanical filters (and the next generation of improved multipole crystal filters) had a sharper selectivity curve that is much more pleasant to listen to than comparable selectivity achieved from dual or triple conversion and a low IF. The additional oscillators in a multiple-conversion receiver require extensive engineering to avoid the problem of annoying birdies.

Another innovation was the product detector. This circuit matched the signal strength with the beat oscillator signal to provide the correct level. It eliminated having to adjust the RF gain to achieve the same purpose.

These products were built into the standard cabinet enclosures and required a large table top to accommodate the bulky packages.

ENTER THE KWM-1

The KWM-1 had provisions for any ten 100-kHz bands between 14 and 30 MHz. Receiver sensitivity was rated at 1 μ V for 6 dB S/N and selectivity was 3.0 kHz. It not only incorporated the latest design features, but offered a new approach to circuitry. Collins did this by rethinking the entire approach to transmitter and receiver design. Here are some of the innovations:

1. For the first time in *modern* communications equipment, Collins used many of the same circuits for transmitting and receiving. (Unsophisticated two-tube VHF transceivers made by Abbott and others in the 1930s had used single-dial control and shared circuits, of course.) This cut the number of tubes and further reduced circuit complexity and equipment size.

The combined transmitter and receiver VFO gave one-dial tuning. Virtually all other equipment of the era used separate transmitters and receivers. In some cases, these were packaged together but did not have single-dial frequency control. Other shared circuits were the IF/sideband generator (including the mechanical filter) and the low-power RF stages.

2. The most important innovation was also the

simplest. Collins recognized that transmitting SSB requires a much lower duty cycle than AM and designed the KWM-1 to take advantage of this fact. The two 6146 final amplifier tubes had a steady-state plate dissipation of 25 watts each, yet the KWM-1 was rated for 200 watts PEP. Unlike other SSB gear which was really AM equipment with a sideband adapter added, the KWM-1 broke the pound-a-watt rule with a transceiver and power-supply package designed only for SSB-CW operation that weighed 1/4 pound per watt and measured 6" by 18" by 10".

3. In addition to these unique features, Collins' designers used the best technology of the time including the mechanical filter, a product detector, one-kHz dial calibration and outboard power supplies for base or mobile operation. The DC supply was the first high-power transistorized power unit.

There was nothing like it on the market. The result was a package with the same specifications as the top-of-the-line 75A-4 receiver and the massive KWS-1 transmitter (though operating on fewer bands and at lower power). Even Collins did not fully appreciate their own accomplishment. The June 1957 advertisement announcing the KWM-1 pitched the transceiver as primarily a mobile rig; the ad in October 1957 headlined "Fixed Station Performance in a Mobile." Collins continued to advertise the 75A-4 and KWS-1. Except for the reviewer quoted above, no one seemed to recognize the impending revolution.

ANOTHER COLLINS FIRST



KWM-1

With These Firsts in Amateur Mobile Equipment:
 FIRST TRANSCEIVER • FIRST SSB • FIRST VOX AND SPEAKER ANTI-TRIP CIRCUITS • FIRST ALL-TRANSISTOR POWER SUPPLY • FIRST AUTOMATIC LOAD CONTROL • FIRST PRECISION TUNED VARIABLE FREQUENCY OSCILLATOR • FIRST TO USE MECHANICAL FILTER • FIRST CRYSTAL-CONTROLLED BFO AND RECEIVER HF OSCILLATOR.

While this radio was not cheap, retailing for \$850 with power supply, it was priced \$500 less than the 75A-4/32S-1 combination and cost about the same as the total for a good sideband transmitter-receiver combination from Hammarlund, Hallicrafters or National.

The production life of the KWM-1 was only two years, replaced by the now-venerable and much more famous KWM-2. It was more than five years until most other manufacturers marketed a line of small multi-band SSB transceivers. My own KWM-1, after more than 30 years' service, exceeds the manufacturer's specifications with a sensitivity of .5 uV for 10 dB S/N. I am on the air with this rig weekly and get wonderful signal reports, with particular praise for the audio quality. Best of all, this little gem has withstood the test of time.



Another old-time station, that of W. C. Anderberg, W6TXR. The transmitter is a normally a 201A tube as a Hartley oscillator at three watts. Results over several years: Washington, Hawaii, British Columbia, Utah, Montana, and five other states. Transmitter power is from a 12-volt car battery and 250-V dynamotor. Receiver: a single UV-199 with movable tickler coil and 12 volts of "B." For the QSO Party last October, "WC" went high-power with a WE 216A in the rig at nine watts. With an outboard UV-199 stage the receiver, W6TXR heard W00G, W2BJI, and W8JJY. Note the batteries and oil lamp: found in a good many amateur stations on farms in the old days.