

TRANSMITTERS

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The Collins 30K-1 Station — An Amateur's Dream

A Little History

The 30K series was designed by Collins engineer Warren Bruene in 1945 and was first offered for sale the following year. It was, in some way, a “Hail Mary Pass” for Collins as the war contracts were drying up, but amateur radio operation was still under a wartime ban. Collins forecast a pent-up demand for ham gear with the return of GIs from the war and the elimination of the ban.

However 30K sales were somewhat limited as the 1946 cost of the 30K-1 transmitter and 310A exciter was \$1450. This was equivalent to approximately \$15,000 in today's dollars. According to *The Pocket Guide to Collins Amateur Radio Equipment 1946-1980*, an excellent publication by Jay Miller, KK5IM, less than 100 of the 30K-1 are known to have been built, and few survive today—making this a rare transmitter indeed.



A complete Collins 30K station graces this shack. Directly behind the chair is the 75A1 receiver with matching speaker on the wall above. To the right of the receiver is the 310A exciter. The 30K-1 transmitter stands next to the desk.

A Tour of the 30K-1

Visually, a 30K series transmitter is most impressive to behold. It's housed in a cabinet 5½ feet tall, finished in black wrinkle paint, and weighs over 350 pounds. This is a big transmitter! My friend Fred Hammond, VE3HC, used to say that it was the largest weight-to-power ratio of any of the transmitters in his museum! The design of the unit is pure art deco; vertical and horizontal chrome accent strips, a large window for viewing the 4-125 final tube, and a most impressive meter panel at the top of the cabinet, also housed behind glass. Looking every inch a serious transmitter, the 30K-1 is of robust construction along the lines of commercial broadcast gear.

Emission modes are CW and Fone (AM), with the plate input power given as 500 watts on CW and 375 watts on AM. Coverage was from 80 to 10 meters using two plug-in output coils. The tube complement

was 11 tubes the transmitter and 10 tubes in the 310A exciter. The 30K station as much a delight to operate, as it is to look at.

One word that comes immediately to mind about the 30K-1 design is “robust,” especially if you are used to other amateur gear of the era. Although built as an amateur unit, the rig shares many of the design characteristics with its big brother commercial broadcast gear, and is unusually roomy to work on. The 5½ foot cabinet contains four separate decks; the high voltage power supply deck, the low voltage power supply deck, the modulator deck, and the RF deck.

Power requirements are moderate, 115 VAC at 1350 watts of current. The RF output network, which is mounted by four ceramic standoffs to the front of the cabinet, completes the layout. Like most commercial broadcast transmitters the heavy iron, in this case the plate transformer, is located on the bottom of the cabinet.

Restoration Issues

Each deck is connected via a terminal strip on the rear panel allowing easy removal for servicing. Tube replacement and most other standard maintenance items can be carried out with the decks in place. Should deck removal become necessary, say for replacement of an under chassis component, you must remove the four retaining bolts which hold the deck to the support rails. Once these are removed, and the wiring disconnected, the deck slides right out for servicing. The high voltage deck uses a pair of 866 mercury vacuum rectifier tubes to handle the HV supply duties. The design is both simple and robust, really overbuilt for amateur service. The things to check here are pretty standard with any HV supply; look for arcing to ground, loose connections, or damaged insulation. Heavy oil filled caps are used exclusively on this deck, so capacitor failure should not be an issue.

In general the HV and LV wiring insulation used by Collins appears to be very resistant to breakdown, and so thankfully the wiring in most units is in excellent condition. Failures of the plate transformer have been reported on the Collins email reflector, so be cautious here. The plate transformer is a heavy Thordarson unit, secured to the cabinet base with four 12-24 retaining bolts. The low voltage supply deck uses a standard line up of 5R4GYs for bias and low voltage rectification. Things get really interesting on the modulation deck. Collins chose the now-rare 75TH tubes as modulators. The 75TH has a large circular globe with a nice bright filament, and is really a very attractive tube in operation. Unfortunately Collins did not provide a viewing window for the modulator tubes, so one has

to be content with the glow of the 4-125 final. Some folks have reported success using the more common 100TH tubes as replacements for the 75TH; I understand a bias modification is necessary.

Collins built a very robust and flexible link-coupled output network into the 30K-1, allowing both parallel and series tuning. The lower bands, 80 and 40, are handled with one large plug-in coil, while the upper bands use a somewhat smaller one. RF is output through one set of feedthrough insulators mounted on the upper rear of the cabinet. Thinking ahead, Collins design made provision for the use of multiple antennas with the installation of additional feedthroughs and the ability to directly tap off each section of the bandswitch.

30k-1 Accessories.

The Collins 310A exciter, another Warren Bruene design, is like a small transmitter in itself. Using the venerable Collins Permeability Tuned Oscillator and a pair of



Rear view of the 30K-1 with access door open. From the bottom: plate transformer, high-voltage supply, low-voltage supply, modulator, final, and output network.

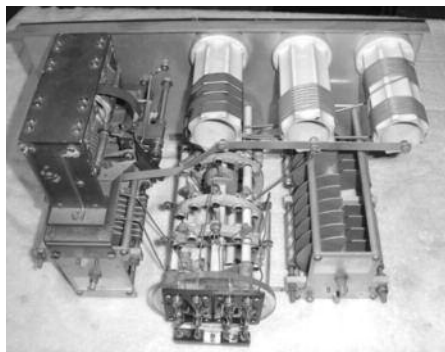
807 tubes, the unit is as robust as the transmitter it is matched with. The spotting and keying of the 30K is controlled from the the exciter via a 5-wire harness. The RF cable from the exciter uses one of those old single pin connectors similar to the one frequently used on transmitters like the Heathkit DX-100.

Collins thoughtfully offered a matching receiver for the 30K-1 series, the Collins 75A1. Similar in height to the 310A exciter, the 75A1 shared the same slide rule tuning dial. The double conversion circuit of the 75A employs fourteen tubes, including rectifier. Coverage roughly matched that of the 30K-1, from 8 to 10 meters in six selectable bands. Like the 30K1 and 310A, the 75A1 is no lightweight, coming in at 57 lbs. Reception of CW and AM Fone were the standard, but with carefully tuning and control of the RF gain, one can readily tune in today's SSB signals.

Operation

Operation of the 30K-1 on the air could not be simpler once you get used to the lack of push-to-talk circuitry. Rather than keying off the microphone, the 30K-1 is designed to be keyed off the front panel switch of the 310A exciter. One simply places the 310A switch in the CAL position to zero beat the 75A-1 receiver, then in the REC position to listen in, and finally in the SEND to key the 30K-1 and transmit.

Remembering to turn a switch to go between send and receive does take some getting used to, but it eventually becomes quite natural. Provision is even made in the 310A to mute the 75A-1 during transmit.



The 30K-1's very versatile output network (see text).

The 30K-1, with its 250 watts of AM Fone power, is great for those late night QSOs. You know that you have plenty of reserve power to overcome atmospherics, and still provide that static quieting full-bodied AM sound. The stock 30K-1 audio is as Collins intended it, punchy and crisp, not at all objectionable. A limiter, using a 6H6 tube, was engineered into the unit to allow full modulation without distortion. The limiter can be defeated by adjusting a pot, or just removing the 6H6 tube.

With the exception of changing the output coil for the higher bands, everything on the 30K-1 can be controlled from the front panel of the transmitter or exciter. Bandswitching, grid tuning, and output matching are easily accessible. Collins thought of almost everything in planning the 30K-1, 310A and 75A-1 station. It really was the dream station of the 1940s radio amateur, and arguably remains so today, some 60 years after its introduction.