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**Author:** John H. Dilks III, K2TQN

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# OLD RADIO

## Build Your Own 1920s Transmitter

Finding an early homebrew 1920s transmitter is difficult; there just aren't enough of them left to go around. During the late 1920s and early '30s when money was short, these rigs were dissembled and the parts reused in other circuits. Sometimes the same parts found themselves in several radios over the years.

After World War II, when inexpensive high-quality surplus gear hit the market, the old 1920s parts were relegated to the "junk boxes" that most hams had at the time. These junk boxes have been showing up at hamfest for years now, and their ancient '20s-era electronics are often sold at bargain prices.

I have been buying vintage parts at hamfests for several years now. I have almost everything I need to achieve my goal: building an authentic 1920s transmitter. The one I plan to build is the two-tube shown in Figure 1. You can do this, too. The trick is learning how to find and identify the components.

The best technique is to study antique parts at a radio museum. If you're lucky, you'll find someone in your area who already owns the components and will let you examine them firsthand.

The next best method is to find a radio catalog from that era, or a reprint on CD-ROM or paper. Carefully study the parts listed for sale. Old *QST*'s and the *QST* CD-ROM sets are also excellent resources. There are many transmitter circuits, photos and parts shown in each issue.

For this column, let's concentrate on two particularly rare parts. Should you spot either of these for sale, don't let them get away!

### The Rotary Chopper

Amateur "spark" reception was easy when most hams had crystal sets or those early one-tube detectors; the spark signals were modulated. With the introduction of vacuum tube continuous-wave (CW) transmitters, spark reception became increasingly difficult for those with older receiving equipment.

So that others could hear their signals, hams first tried buzzers. They were wired into the transmitter's grid circuit, so when the key was pressed, the "buzzing sound" modulated the radio wave. This worked, but it needed improvement.

The following is quoted from a 1922

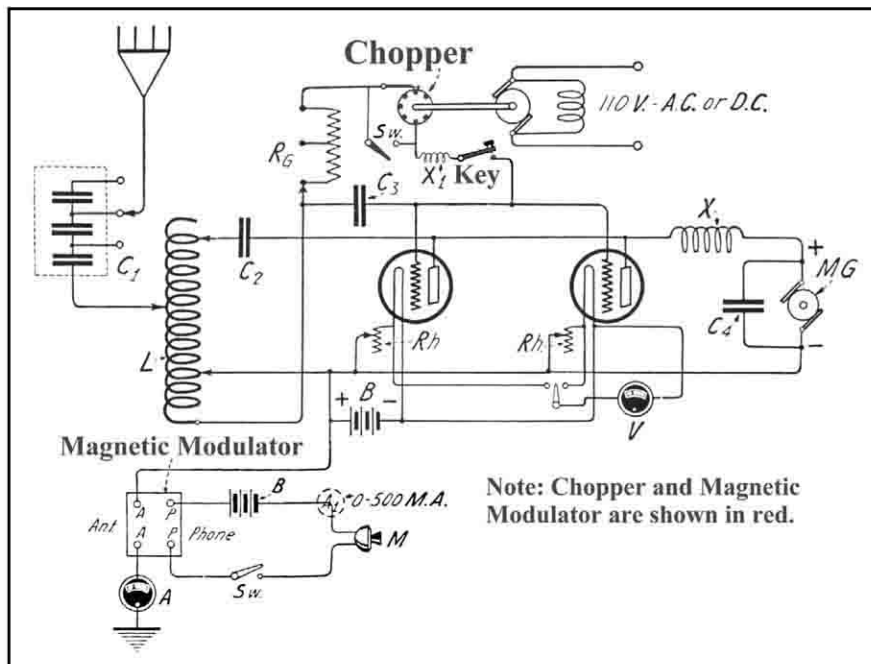
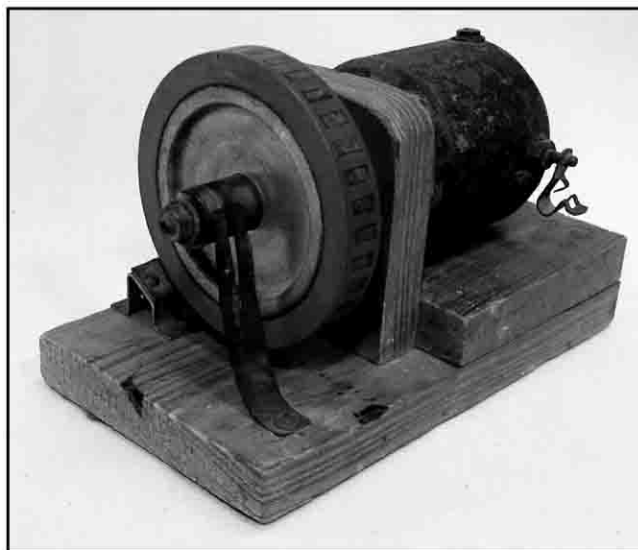


Figure 1—A schematic diagram of a two-tube transmitter from 1922 (adapted from the Robertson-Catacract Electric Company catalog).



A rotary chopper assembled and owned by W5AWA in the early 1920s.

radio catalog: "Long experience in the use of audio frequency buzzers to modulate the output of a tube set to produce damped wave trains has proven that this method is not entirely satisfactory, principally for the reasons that the operation of the buzzer is not constant, necessitat-

ing frequent adjustment, and that great care is required in adjusting the circuit to obtain 100 percent modulation.

"The Rotary Chopper, PX-1638, has been developed primarily to overcome the above objections. When used to secure interrupted continuous wave, or

ICW telegraphy, the motor-driven interrupter, or rotary grid chopper, has the following inherent advantages over the other methods:

“(a) Gives positive interruption, requiring no adjustments. The note obtained can be varied to any desired pitch by changing the driving motor speed, typically at 600 cycles.

“(b) This system of securing damped wave trains does not require modulating tubes, the interrupter being used in series with the transmitting key.

“(c) The system inherently gives 100 percent modulation, since oscillations can be completely started and stopped at audio frequencies.

“(d) The output obtained from a given number of oscillators is in general greater than if some of the tubes are used as modulators.

“The interrupter wheel is built with 34 conducting and 34 insulating segments, making 34 interruptions per revolution. The insulating segments are molded in a single piece.”

The cost for the wheel and electrical contactors, without a motor, was \$7.25 in 1922 dollars. To see how it was connected, see Figure 1.

### The Magnetic Modulator

This device is essentially a transformer wired in series with the ground leg of the antenna circuit.

From the 1922 radio catalog: “One of the most important inventions brought forth in the field of amateur radio telephony during the past year is the Magnetic Modulator. This development has resulted from RCA’s experiments with the Alexanderson Magnetic Amplifier, a device that is used at all its high-power transoceanic stations to control the output of 200-kW radio frequency alternators. The same fundamental principle has been adopted here....

“[The modulator] utilizes the properties of iron at radio frequencies to control or modulate the output of an oscillating vacuum tube.... It simply acts as a variable resistance connected in series with the antenna circuit.”

Three models were manufactured: UT-1643, for  $\frac{1}{2}$  to  $1\frac{1}{2}$  A antenna current, \$9.50; UT-1357, for  $1\frac{1}{2}$  to  $3\frac{1}{2}$  A, \$12.00; UT-1367, for  $3\frac{1}{2}$  to 5 A, \$17.00 in 1922 dollars. The one shown here is the UT-1643 model.

### Conclusion

The time spent studying will pay off when you spot a goodie sitting on or under a hamfester’s table. You’ll recognize it immediately and be able to beat out the other collectors.



A magnetic modulator, circa 1922.



K2TQN’s early transmitter parts. From the left: a filament transformer; an oscillation transformer (coil); a 50-W filament rheostat; a 5-W 202 tube and socket; a 50-W 203 tube and socket; a blocking condenser; a rotary chopper, an old tube transmitter panel with various meters; an early microphone; and a magnetic modulator.

Don’t expect to complete your search for parts overnight. Patience pays in radio collecting. It may take you several years, depending on where in the country you’re located, and how many hamfests you get to. Also, read the classifieds in *QST* and in the specialized collector magazines. I hate to say it, but eBay ([www.ebay.com](http://www.ebay.com)) may be a place to find those elusive parts, at higher costs, though.

An alternative: you can build this or a similar transmitter with all newer parts. This will give you great satisfaction and

an opportunity to learn about older circuits.

**A note of caution:** Not all old circuits are legal to run on the air under today’s communications laws. Please be careful. Make sure you check your transmitter for spectral purity before attempting to put it on the air.

Additional information and a parts list are available on my Web site: [www.eht.com/oldradio/arrl/index.html](http://www.eht.com/oldradio/arrl/index.html). Good hunting, and look for my call letters on my hat at the hamfests and say “hello.”  
—K2TQN

QST