

A "Flea Power" Short-Wave Transmitter Using Receiver Parts

With a 201A tube fed by a K-111 power pack, this simple outfit produces fine, clear signals for amateur communication purposes.

Super-Wasp owners: You can use your present K-111 power pack for this transmitter as well as for the receiver, and thus save the expense of a separate power supply unit. Build this little transmitter and go "on the air."

THE one-tube short-wave transmitter shown on page 53 of the Volume 3, Number 3 issue of RADIO DESIGN aroused a great deal of interest, and many readers asked about building this outfit with Pilot parts and using it on a K-111 power pack. The requests for "dope" were so numerous that we built an actual transmitter, following the general description given in *The Radio Amateur's Handbook*. It worked without trouble the first time it was turned on, and was so easy to make that we are sure many short-wave fans will find it interesting.

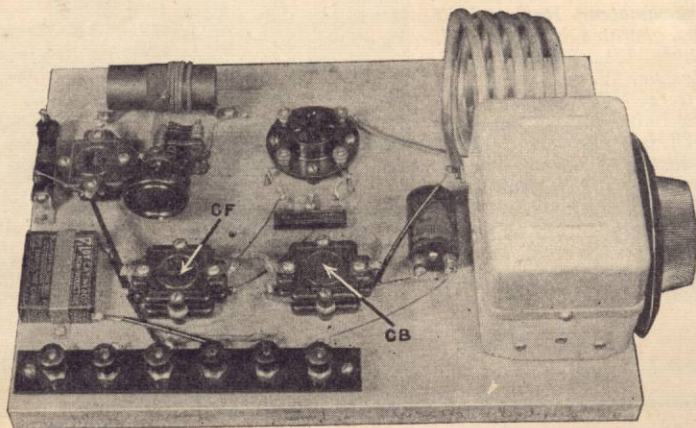
A piece of wood 12 inches long and 10 inches wide was used as the baseboard. Any dry piece of lumber is satisfactory; no expensive bakelite panels or sub-panels are needed. The following parts—all of standard Pilot make and available throughout the world—were used:

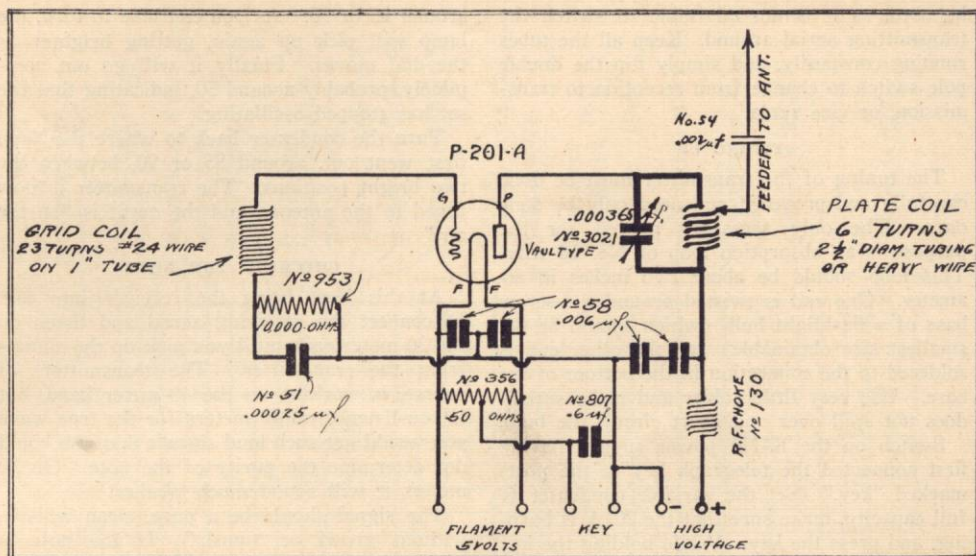
REQUIRED PARTS

- 1—No. 3021 regular Vaultype variable condenser.
- 1—No. 130 radio frequency choke coil.
- 1—No. 213 four prong socket.
- 4—No. 58 mica fixed condensers, .006 mf.
- 1—No. 51 mica fixed condenser, .00025 mf.
- 1—No. 54 mica fixed condenser, .002 mf.
- 1—No. 807 fixed condenser, .6 mf.
- 1—No. 356 center-tapped resistance, 50 ohms.
- 1—No. 953 fixed resistance, 10,000 ohms.
- 6—No. 29 plain binding posts.
- 1—No. 1274 plain bakelite dial.

The parts were arranged as shown in the illustration on this page. In addition to the material listed, the set uses a grid coil consisting of 23 turns of No. 24 cotton covered

The completed transmitter assembled on a board. CF are the by-pass condensers across the filament; CB the plate blocking condensers. The midget condenser in front of the grid coil is not needed.





Hook-up and details of the "flea power" transmitter. The arrangement is very simple and will work without trouble.

wire on a one inch tube, and a plate coil consisting of 6 turns of $\frac{1}{4}$ inch copper tubing wound $2\frac{1}{2}$ inches in diameter. The grid coil is mounted on a pair of little double-L shaped legs, while the ends of the plate coil are flattened, drilled, and fastened directly to the terminals of the Vaultype condenser.

The six binding posts are mounted on a strip of bakelite, which is supported above the edge of the board by a couple of wood screws passing through thick washers. Wood screws hold all the other parts except the variable condenser, which is held by two machine screws running up from the bottom of the baseboard into the tapped holes in the frame.

T.G.T.P. CIRCUIT

The circuit employed by this transmitter is of the tuned-grid, tuned-plate type, and is favorably known for its simplicity and reliability. It has only one control, and is simpler in construction and operation than most short-wave receivers. We will not attempt to describe its theory of operation, as this is admirably handled in the *Handbook*.

For the wiring, use ordinary hook-up wire, being careful to solder all the joints solidly.

SPECIAL ANTENNA NEEDED

Much of the success of any short-wave transmitter depends on the antenna system. While almost any piece of exposed wire serves for receiving purposes, the aerial for transmitting use must be carefully erected and must be of a certain exact length. For this particular transmitter, the top section must be

exactly 66 feet long, and should be as straight as possible. The lead-in wire, which is more properly called the "feeder," must be attached exactly 23 feet, 11 inches from one end, and should drop down at right angles for at least 20 feet or so. It can be of any length. No. 14 or No. 12 solid copper or seven strand No. 22 wire may be used, with good glass insulators.

No ground connection is needed. The feeder wire terminates at a .002 mf. fixed condenser, the other end of which is fitted with a clip to snap on the turns of the plate tuning coil.

USES 201A TUBE

As this is an elementary transmitter, and is intended as a "first" set to enable a fan to get into the amateur short-wave game at little cost, it is designed to use a 201A tube. Its dimensions have been fixed so that it operates in the so-called 40-meter amateur band, which is the most popular one. The actual frequency will fall somewhere around 7200 kilocycles, which is well within the 7000-7300 kc. band.

A standard Pilot K-111 power pack is used for plate supply. If you are already using such a pack with an A. C. model K-115 Super-Wasp, you can also use it for the transmitter by arranging a simple double-pole, double-throw knife switch to throw the "B" minus and "B" plus 220 volts from receiver to transmitter. None of the other connections between the K-111 and the receiver are disturbed. The 5 volt winding of the pack, which is not used with the Super-Wasp, runs the filament of the 201A. This arrangement works out very conveniently. A separate receiving aerial must

be used, as it is not advisable to switch the transmitting aerial around. Keep all the tubes running constantly, and simply flip the double pole switch to change from reception to transmission, or vice versa.

TUNING UP

The tuning of the transmitter must be done carefully and properly, and need only be done once. The only accessory needed for the purpose is an absorption loop of No. 18 wire. This loop should be about two inches in diameter. One end is twisted around the screw base of a flashlight bulb (which should be the smallest size obtainable) and the other end is soldered to the connection in the bottom of the base. Use very little solder and make sure it does not spill over and short circuit the bulb.

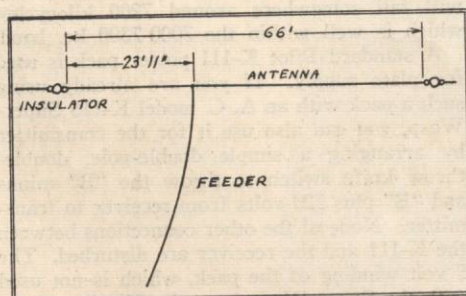
Switch on the K-111 power supply, having first connected the telegraph key to the posts marked "key." Set the variable condenser to full capacity, make sure that the 201A is burning, and press the key. While holding the key down, bring the loop slowly toward the inside end of the plate coil. The lamp should begin to glow, indicating that the set is working. Hold the loop parallel to the turns of the coil.

If the bulb does not light when very close to the coil, release the key and go over the connections. It is doubtful if there will be any hitch to the proceedings, as the transmitter is so simple as to be practically foolproof.

GETTING ON THE AIR

The only remaining thing to be done is to put the transmitter actually on the air. The process is as follows:

After the lamp is glowing properly, snap the feeder clip on the second turn from the inside of the plate coil, making sure it does not touch the adjacent turns. Hold the lamp loop steady in a position where it lights with a fair degree of brilliance, and—holding the key down with a book—turn the dial of the condenser *slowly* down from the present full position of 100. As you do so, the lamp will grow dimmer, finally going out altogether, probably



The 40-meter aerial for the transmitter must have exactly these dimensions.

around 85 or 90. As you continue to turn, the lamp will pick up again, getting brighter as the dial moves. Finally it will go out completely, probably around 50, indicating that the set has stopped oscillating.

Turn the condenser back to where the lamp first went out, around 85 or 90, between the two bright positions. The transmitter is now tuned to the antenna and the outfit is "on the air."

CHECKING THE NOTE

At this time bring the receiver into use. Disconnect the receiving aerial and listen on the 20 meter coils until you pick up the signals from the transmitter. The transmitter, of course, is working on the 40 meter band, but if you listened on 40 meters for the true wave you would get such loud signals that you could not determine the purity of the note. On 20 meters it will sound much weaker.

The signal should be a pure, clean whistle, without growl or "mush." If the note is rough or unsteady, move the feeder clip back and forth, rechecking each time with the flash light loop. Once the best position has been found, leave the outfit alone.

The transmitter illustrated on these pages was made by the editor of RADIO DESIGN and used successfully in New York under the call letters W2CTG. It is now on the air from Lawrence, Mass., as W1BRZ.

FOR CODE ONLY

Please note that this transmitter can be used only for dot and dash transmission, and that it involves a knowledge of the radio code. Many people would like to go on the air with radio telephone transmitters, and not use code at all, but they are cautioned that they must know the code anyway in order to obtain the highly necessary amateur radio operator's license required by the government.

Short-wave radio telephony is not an easy science, and is much too complicated for the beginner. Start off with a simple "flea power" transmitter like this one, get some experience on the air, and you will naturally graduate into bigger outfits. Short-wave transmitting is interesting because so many different combinations of circuits and parts are possible. If you like to experiment you will find a transmitter an instructive and useful toy.

For complete details on obtaining licenses, learning amateur practices and traditions, handling traffic, etc., we again refer you to the *Radio Amateur's Handbook*, that veritable gold mine of information. An amateur without a *Handbook* is like a carpenter without a hammer; it's the basic tool of the profession. Although RADIO DESIGN does not publish this book, it handles it as a service to its readers, and can fill orders without delay at the regular price of \$1.00 per copy, postpaid anywhere.