

# The Junior Demon 5-Watt Transmitter

By G. CARROLL UTERMAHLEN, W3HVD



"JUNIOR" was a prewar baby, born of my desire for a compact transmitter capable of local and dx contacts with a minimum of power. This midget demon has, at one time or another, gone all out in his efforts to mate with another c.w. station and, at such times, has disregarded his usual operating procedures. Junior, you see, is trying for WAS!

Most hams have been spoiled by high power, so here is the chance to test your operating ability with the barest essentials! Junior is capable of getting out in a big way. A good antenna, proper tuning, and clean operating ability will enable this peanut whistle to reach hundreds of miles out into the night.

A 70L7-GT tube was used because it was the only tube of its type available when the original Junior was built. A 117L7-GT tube may be substituted for the 70L7-GT by omitting the line-cord resistor and noting the proper changes in tube socket connections. The circuit component values are not critical, but substitutions should be made with care.

Several of these little rigs have been built by other hams, and while some did make changes in parts values, all of the rigs worked very satisfactorily.

Construction details will vary with the materials available. The following dimensions are given as a guide for those who are interested in duplicating the original unit.

The aluminum chassis is of 1/16-inch stock, and is 2 3/8 inches high, 6 inches long, and 3 1/4 inches deep.

A 3/16-inch slab of Masonite is used as a front panel. It is 5 1/2 inches high and 6 3/16 inches long. All voltage-carrying parts are mounted on the front panel (under the chassis) or, if chassis mounting is more convenient, the parts should be carefully insulated from the chassis itself. No ground should be al-

lowed to come in contact with the chassis or any voltage-carrying component!

The crystal, tube, both coils, and the antenna-tuner variable condenser are above deck. The remaining parts are below deck. A careful survey of the chassis and panel will indicate the proper placement of parts with the least possible crowding.

Nearly every amateur agrees that the 40-meter band is the best for all-around good results with low power. Forty meters offers interstate QSO's with low power during normal periods, and still greater distances may be spanned during periods of skip. The 5-watter is designed to operate on 40 meters. It has been used with good results on other bands (80 and 160), but the coil data are for 40-meter inductances only.

L1, the plate-tank coil, consists of 14 turns of No. 24 d.c.c. wire, wound on a standard 4-prong tube base 1 1/8 inches in diameter. L2, the link-line coupling coil, is wound over L1 (using a thickness of paper tape as insulation between coils) and consists of 4 turns of No. 24 d.c.c. wire wound near the "cold" end of tank coil L1.

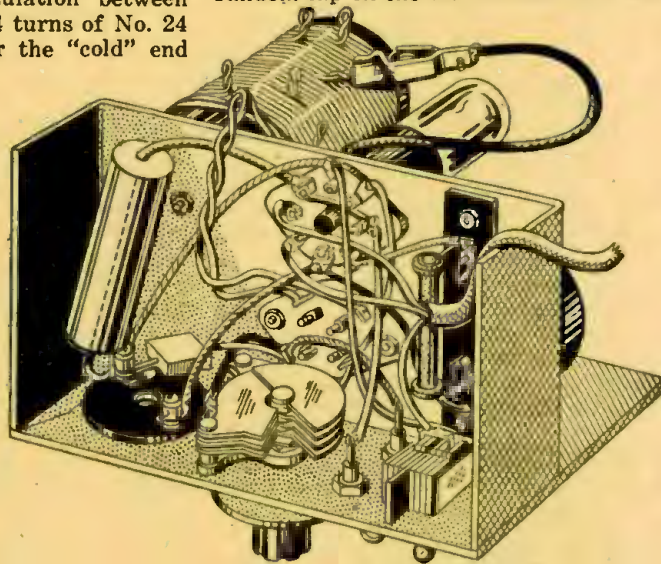
L3 and L4 are the antenna tuning coil. L4 consists of 38 turns of No. 14 enameled wire, close-wound, on a large size 4-prong coil 1 1/2 inches in diameter, and is tapped at the 8th turn starting from the ground end of the coil. After the first tap the coil is tapped at every 5th turn. The placement of taps is not critical, but the more taps available, the better the coupler can be adjusted to a given load. Coat L4 with Duco cement and allow to dry before adding L3. L3 consists of 2 turns of hookup wire wound over the first 8 turns of L4. L3 is first wound over L4, after which the remaining wire is twisted to form the link-line, the opposite end of which is connected to L2. Before winding L3-L4, remove the 4 metal prongs from the coil form by sawing them flush with the bottom of the form with a hacksaw. Drill a hole in the center of the bottom to mount it on the chassis. BC1 and BC2 are small

battery clips, and are shifted about on L4 when the transmitter is being matched to a given antenna.

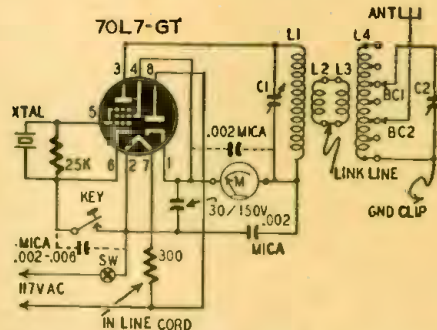
Putting Junior on the air is a very simple matter and requires little effort. Plug the line cord into a convenient outlet, either a.c. or d.c., and the coil L1-L2 and a 40-meter crystal into their sockets. Set C2 at minimum capacitance, and with BC1 and BC2 out of the circuit, close the key and rotate the tank tuning condenser C1 until a flashlight bulb attached to a small loop of wire and held over L1 glows brightest. Then back off C1 a bit, so that the oscillator is not at the peak of resonance. If this is not done, either the oscillator will quit when the antenna is coupled to the transmitter, or the emitted signal will be rough or chirpy. Remember: Do not operate the oscillator too near resonance!

## Antenna tuning

With the key open, attach BC1 about midway up the coil L4 and BC2 to a random tap on the coil between BC1 and



This illustration shows the under-chassis wiring of the 5-watt demon.



Schematic of the 1-tube a.c.-d.c. transmitter. Two additional capacitors are suggested.

ground. Connect a small 110-volt, 7 1/2-watt bulb between BC2 and the antenna itself, close the key, and rotate C2 for maximum brilliancy from the bulb. If the bulb fails to glow, try different tap settings for BC1 and BC2. When the antenna tuning process has been completed, remove the bulb from the circuit.

Tip jacks are provided for a 0-100 milliammeter. When not in use, they should be shorted with a piece of wire. Fully loaded and ready to go, Junior

(Continued on page 82)

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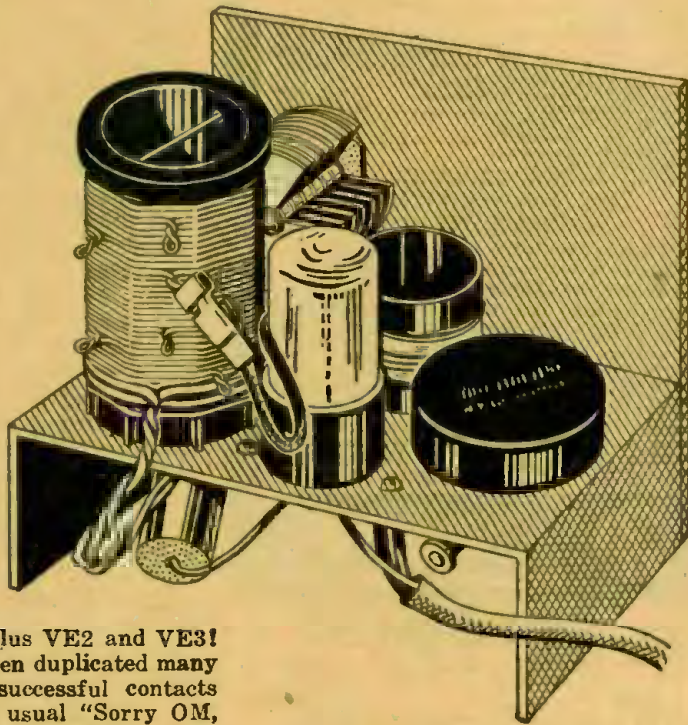
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shows a meter reading of 50 ma at 110 volts. A mere 5.5-watt input; but just take a few looks at Junior's record!

As an experiment, on a sultry July afternoon, a 15-foot piece of wire was attached to the rig and stretched down an upstairs hall. A W8 was raised, but the QSO was not completed. A W9, in Chicago, was also raised; this contact also fell through, but not before Junior had been given a signal report of RST 5-8-9X! With a 132-foot antenna, working a gainst ground, the little rig has worked (from Baltimore) about 20 states in the following districts: W1, W2, W3, W8, W9, and W0, plus VE2 and VE3! These QSO's have been duplicated many times, some being successful contacts and some being the usual "Sorry OM, QRM got you that time" variety.

(Sent to RADIO-CRAFT for testing, the little transmitter was set up in the Bronx, and worked W3, W8, W9, and—crown of the evening—G2! Tests were stopped immediately. T9 note was reported on most contacts, though the note can be spoiled by tuning the output too

close to the crystal frequency.—Editor)  
And all this with a transmitter that uses less than five dollars worth of mafe-



rial and can be thrown together in a few hours by any reasonably adept ham! Cost is not the only advantage, either. With more attention to compactness, this would make an ideal rig for vacationing amateurs, fitting in a corner of the suitcase.

Considering expenditure and results, this 5-watter is a really useful addition to any ham shack, whether the operator is a beginner or an old timer. Give Junior a whirl some frosty winter night, and you'll forever rue the day that you started buying high-power transformers and bottles. Unless, that is, you prefer brawn to brains. And some do!

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