

# Transmitter

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## for the

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# Neglected Band

NO LICENSE IS REQUIRED  
FOR THE 1750-METER (160-190-kHz) BAND

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**A**S LONG AGO as 1950, the Federal Communications Commission issued Part 15 of its Rules—an action we are all familiar with because it legalized the operation of unlicensed walkie-talkies of the 100-mW class in the 27-MHz (11-meter) CB band. The same action also set up a 30-kHz band between 160 and 190 kHz. This relatively unknown, unused band can be utilized for experimental, unlicensed operation provided certain technical requirements are met. The latter include: transmitter input power must be limited to 1 watt; antenna and feedline length must not exceed 50 feet; emissions outside the band must be down at least 20 dB below the unmodulated carrier; and operation must be on a non-interference basis. There is also the universal rule: no profane or illegal language!

You may wonder what can be done at these low frequencies with only one watt. Here, the ground wave is the thing. On a cold winter night, with an efficient antenna, you can work up to 100 miles. There are no restrictions on the type of emission that can be used; so you can experiment with radioteletype, SSB, FM, conventional AM, or just plain CW—as long as you observe the band limits with your modulation and make sure that no commercial station is on the air in your location.

What do you do all this with? The gear described here is an easy-to-build, low-cost transmitter using only three tubes. (A companion tuner will be described next month.) The r-f portion of the transmitter (Fig. 1)

uses a dual triode (V1), with one half used as the oscillator and the other half as the r-f amplifier. Crystals for this frequency are expensive and hard to find, but the oscillator circuit used here is very stable. Another dual triode (V2) is used as the speech amplifier with gain control between stages. These two stages provide ample gain for a ceramic or crystal mike. The speech amplifier drives V3, a class A modulator.

The power supply is a conventional half-wave rectifier with filter.

**Construction.** The prototype was assembled in a 7" x 9" x 2" aluminum chassis as shown in the photographs. Although the layout is not critical, it is suggested that the same general approach be used. Note that the transmitter coil L2-L3 is on a plug-in

### EDITOR'S NOTE

Although the transmitter described here does not require a license for operation, strictly speaking it may need a certificate attached to it. The certificate may be executed by "a technician skilled in making and interpreting the measurements that are required to assure compliance" with Part 15 of the FCC Rules. The certificate should contain information on the operating conditions of the device, the antenna being used, a statement certifying that the device complies with the FCC Rules as described in this article, and the date of construction.

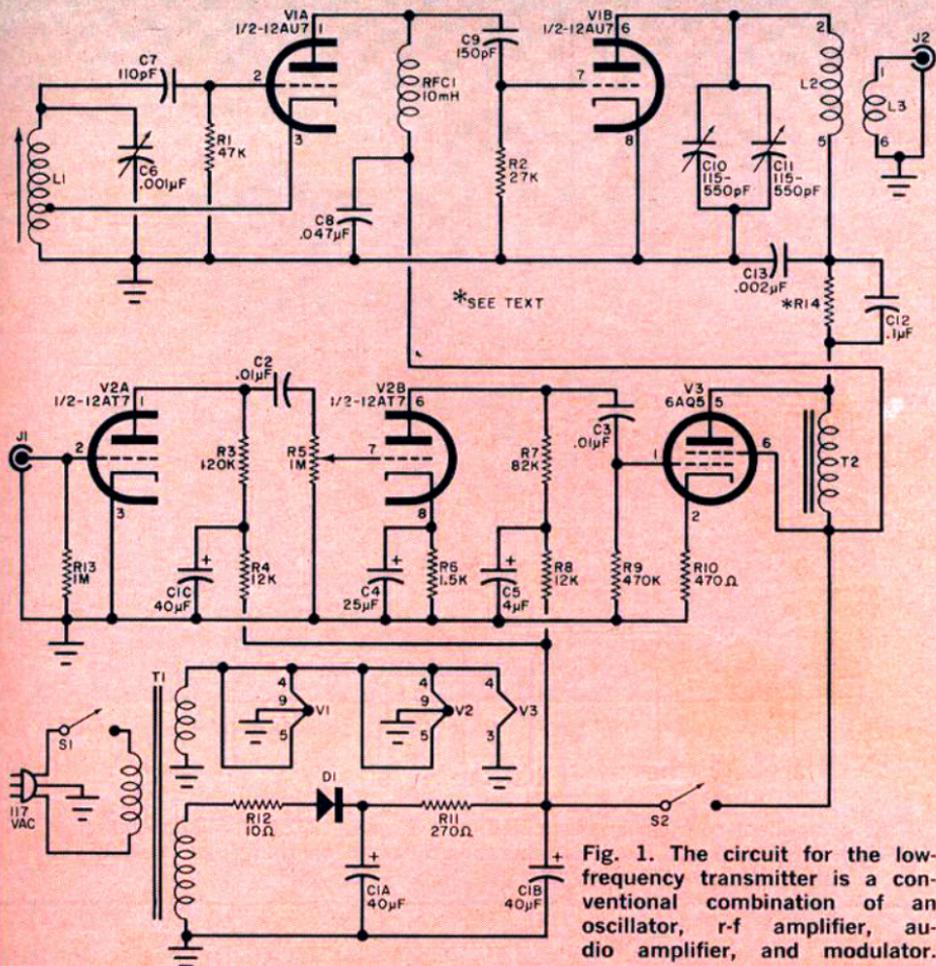


Fig. 1. The circuit for the low-frequency transmitter is a conventional combination of an oscillator, r-f amplifier, audio amplifier, and modulator.

## PARTS LIST

- C1—Three-section, 40- $\mu$ F, 150-volt electrolytic capacitor  
 C2,C3—0.01- $\mu$ F, 400-volt capacitor  
 C4—25- $\mu$ F, 25-volt electrolytic capacitor  
 C5—4- $\mu$ F, 150-volt electrolytic capacitor  
 C6—0.001- $\mu$ F, 500-volt silver mica capacitor  
 C7—110-pF, 500-volt mica capacitor  
 C8—0.047- $\mu$ F, 400-volt capacitor  
 C9—150-pF, 500-volt mica capacitor  
 C10,C11—115-550-pF trimmer capacitor  
 C12—0.1- $\mu$ F, 400-volt capacitor  
 C13—0.002- $\mu$ F, 500-volt disc capacitor  
 D1—Silicon rectifier  
 J1—Microphone jack  
 J2—Coaxial connector (Amphenol 83-1R or similar)  
 L1—Miller X-5496-C longwave tapped coil  
 L2—200 turns, #30 enamelled wire scramble wound on 1/4" diameter coil form  
 L3—25 turns, #30 wire, scramble wound on top of L2  
 R1—47,000-ohm, 1/2-watt resistor  
 R2—27,000-ohm, " "  
 R3—120,000-ohm, " "

- R4,R8—1200-ohm, " "  
 R5—1-megohm potentiometer  
 R6—1500-ohm, 1/2-watt resistor  
 R7—82,000-ohm, " "  
 R9—470,000-ohm, " "  
 R10—470-ohm, 1-watt " "  
 R11—270-ohm, " "  
 R12—10-ohm, " "  
 R13—1-megohm, 1/2-watt "  
 R14—See text  
 S1,S2—Spst slide or toggle switch  
 T1—Transformer; secondary, 125V at 50mA and 6.3V at 2A  
 T2—8-henry, 40mA choke  
 V1—12AU7  
 V2—12AT7  
 V3—6AQ5  
 Misc.—7" x 9" x 2" aluminum chassis (Bud AC-406 or similar), 7-prong tube socket, 6-prong tube socket, 9-pin tube socket (2), polystyrene coil form 2 1/4" long x 1 1/4" diam (Mayfair 24-6P or similar), terminal strips, rubber grommets, mounting hardware, short length of 52-ohm coaxial cable, antenna system (50 ft max for transmission line and antenna combined).