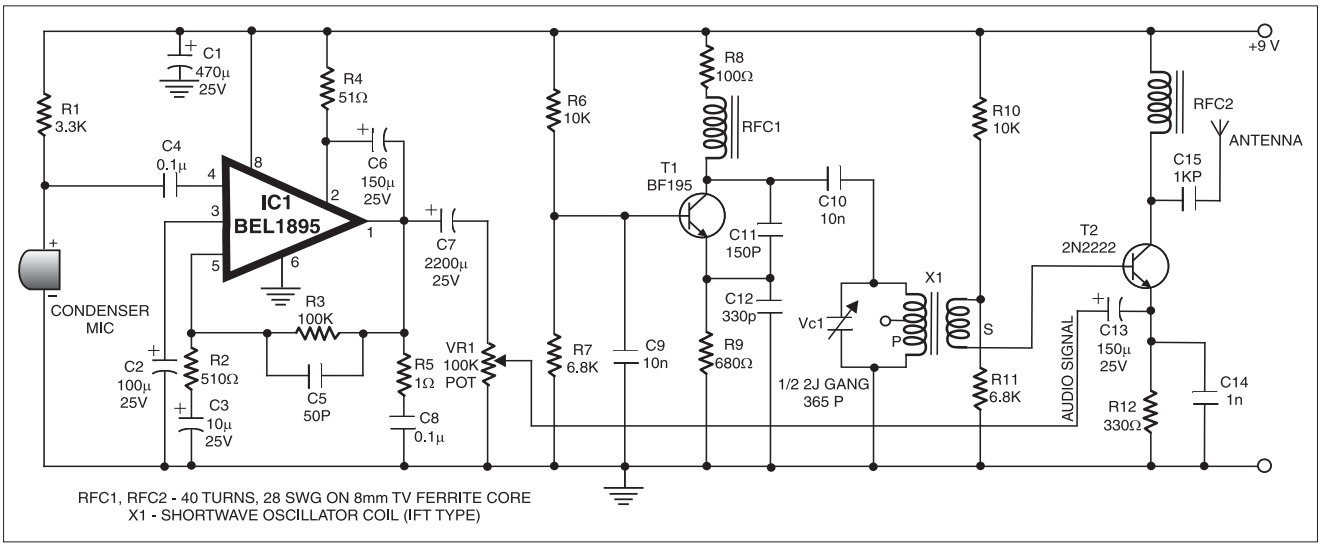
SHORTWAVE TRANSMITTER

This transmitter circuit operates in shortwave HF band (6 MHz to 15 MHz), and can be used for short-range communication and for educational purposes.



The circuit consists of a mic amplifier, a variable frequency oscillator, and modulation amplifier stages. Transistor T1 (BF195) is used as a simple RF oscillator. Resistors R6 and R7 determine base bias, while resistor R9 is used for stability. Feedback is provided by 150pF capacitor C11 to sustain oscillations. The primary of shortwave oscillator coil and variable condenser VC1 (365pF, 1/2J gang) form the frequency determining network.

By varying the coil inductance or the capacitance of gang condenser, the frequency of oscillation can be changed. The carrier RF signal from the oscillator is inductively coupled through the secondary of transformer X1 to the next RF amplifier-cum-modulation stage built around transistor T2 that is operated in class 'A' mode. Audio signal from the audio amplifier built around IC BEL1895 is coupled to the emitter of transistor 2N2222 (T2) for RF modulation.

IC BEL1895 is a monolithic audio power amplifier designed for sensitive AM radio applications. It can deliver 1W power to 4 ohms at 9V power supply, with low distortion and noise characteristics. Since the amplifier's voltage gain is of the order of 600, the signal from condenser mic can be directly connected to its input without any amplification.

The transmitter's stability is governed by the quality of the tuned circuit components as well as the degree of regulation of the supply voltage. A 9V regulated power supply is required. RF output to the aerial contains harmonics, because transistor T2 doesn't have tuned coil in its collector circuit. However, for short-range communication, this does not create any problem. The harmonic content of the output may be reduced by means of a high-Q L-C filter or resonant L-C traps tuned to each of the prominent harmonics. The power output of this transmitter is about 100 milliwatts.