

## Transmitter Theory of Operation

### 1. Modulator

U2B is microphone or guitar amplifier, the output of which is differentiated to result in 6dB/octave pre-emphasis. U3 then compresses the dynamic range of the incoming audio which is differentiated again for 3dB octave pre-emphasis and buffered. Input level is adjusted with R33. R34 sets the deviation level. Microphone bias is achieved via R1.

### 2. Crystal Oscillator

Q1 is a fundamental mode crystal oscillator.

The varactor is in series with the crystal for the direct frequency modulation.

C25 and C26 form a resonant tank with L6 and the output is tuned to 3X the fundamental frequency.

This is fed to the base of Q2.

### 3. Multipliers

Q2 multiplies by two times the third harmonic of the crystal frequency, and is tuned with L9.

Q3 is tuned with L11 and multiplies by two of the output of Q2, resulting in an overall RF signal of 12 times the crystal frequency.

### 4. RF Amplifier

Q4 is an RF amplifier, Tuned by L14,C41 and C43, its output is fed to the "shield" side of the microphone cable.

L14,L15,C41,C43 make up an RF filter designed to suppress harmonics and match the output impedance to the antenna.