Telex Model PST-16
Theory of Operation

Transistor Q101 and its components operate as a voltage variable grounded base Colpitts oscillator. Inductor L101, with the combined effects of C112, C113, VC101, C101, D102, and D101 form the basic oscillator frequency. C112 and C113 are the feedback capacitors. Diodes D101 and D102 are voltage variable capacitors. Diode D102 is used in conjunction with U101 and U101 to phase lock the oscillator . Diode D101 allows frequency modulation of the oscillator circuit. The oscillator frequency is the same as the transmitter output frequency.

Capacitor C114 couples the RF of the oscillator to emitter follower Q102. Transistor Q102 has two output paths. Capacitor C116 couples the oscillator frequency to the phase lock integrated circuit U101. IC U101 operates with the reference crystal Y101 at 10.0 MHz and the channel information supplied from rotary switch S101/U102 to phase lock Q101 oscillator to the reference crystal, assuring frequency stability. IC U102 is a PIC processor that stores channel information. Channel spacing is fixed at 100 KHz except for some channels that are skipped to aid in interference protection to the user. The channel frequencies are fixed by use of PIC U102 and the frequencies cannot be changed by the user or others. Capacitor C117 couples the oscillator frequency to tuned buffer amplifier Q103. L102, C119 and C120 resonate at the transmitter output frequency and deliver the RF to the final amplifier Q104. The output circuit of Q104 is fix tuned to the transmitter output frequency. L104 and C122/C123 form a low pass filter and L105/C124 form a trap at the second harmonic. L106 base loads the permanently attached flexible antenna.

Audio from the input connector is routed to U1. U1B and U2A form a limiting amplifier. Above a certain input level, the output level remains constant, to prevent overmodulation. When this threshold is exceeded, transistors Q5, Q6, Q7 and Q8 provide a rectified control voltage that is fed back to FET Q3 and Q4 that clamp the audio voltage at the junction of R7/C7 completing the limiter circuit. C12 and R16 form the pre-emphasis circuit which is in the feedback loop to insure limiting at high frequencies as well. Control VR101 is used to set the transmitter frequency deviation by controlling the audio amplitude delivered to the frequency modulator D101.

Power for the transmitter is provided by 2 AA size batteries. Q1, Q2 and associated components for a boost converter supplying 9 volts unregulated DC. Additional 5 volt regulation is provided by U2. DS4 is the power ON indicator and also backlights the channel knob.