

Theory of Operation

Receiver

RF Amplifier

Incoming signals from the antenna jack are switched by send receive diode D7 to RF amplifier Q1 via helical resonators T1. Q1's output is amplified and filtered by T2, T3 and T4.

Mixer and Local Oscillator

Q5 is a third overtone crystal oscillator which feeds tripler Q6. The output of Q6 is doubly tuned T9 and T10 and injected at the emitter of mixer Q2 thus converting the incoming signal to 21.4MHz. The 21.4MHz if output of Q2 is filtered by two monolithic crystal filters.

If Amplifier

The 21.4MHz if signal is amplified by Q103 and fed into IC101, which functions as the 2nd oscillator and mixer to 455 KHz. If signal is filtered by ceramic filter FT106 and applied to the amplifier and limiter portions of IC101, which also included the quadrature detector, noise amplifier and squelch control switching circuitry.

Audio Output

IC-1's audio output is de emphasized and fed to j2.

Receiver Voltage Regulator

Q9 is a voltage regulator to provide a stable 5 volt supply to receiver RF and IF circuitry. Its base is connected to the PTT switch through a diode to disable receiver stages in the transmit mode.

Transmitter

Crystal Oscillator and Modulator

Q10 is a fundamental frequency crystal oscillator with temperature compensating circuitry. At low temperatures TH1 becomes effective and compensates for negative crystal frequency drift. J2 pin 1 is DATA input pin. It's in IC3, which is used as amplifier and clipper. IC3's output is filtered and fed via a deviation control into varactor D5 for direct frequency modulation.

Q11 triples the crystal frequency. Its output double tuned. Q12 is a second tripler with a double tuned output feeding third tripler Q14, which has output at the channel frequency.

Driver and Final Amplifier

Q14 is a buffer amplifier exciting pre driver Q15. Drive Q15 produces about 700MW of power to final transition. Q16 which delivers up to 5 watts of RF power output.

Send-Receive Switching

Q20 is a switching transistor. When PTT is activated, Q20's base will be forward biased, causing it to conduct, delivering voltage to the low level transmitter stage, and to regulator Q13 which supplies stable voltage to oscillator Q10 and modulator Q11, Q20 also applies a positive voltage to send-receive antenna switching diode D7 in the transmit mode, causing it to conduct, thus switching the RF input signal to the receiver to a very low level.