Theory of Operation (IM400)

1. Transmitter

1) MIC AMP Circuit

Voice signal from the microphone are applied to microphone amplifier U303. U303 contains a low-pass filter that has a 6dB/oct response between 300Hz and 3kHz and eliminate above 3kHz. The pre-emphasized audio signal is applied to VR302 to adjust maximum frequency deviation.

2) VCO circuit

The transmit frequency is directly generated by the Colpitts oscillation circuit contains Q402,Q403.

3) POWER AMP

Signals from Q202, Q206 is supplied through antenna switch U201 to a low-pass filter made up and then applied to Antenna Jack.

2. Receiver

1) LOWPASS FILTER and Antenna switching circuit.

Signals from antenna connector fed to the antenna switching circuit through the low pass filter consisting of L212~214. In receiving mode, D204 is turned off, isolates the antenna from the transmitter circuit and matching circuitry, so that the incoming signals are fed to the RF amplifier through L211.

2) RF AMP Circuit

The signals from the switching circuit are fed to the RF amplifier Q101 through a band pass filter made up of molded coil, vvc diode and capacitor.

3) MIXER Circuit

The amplified signals are fed to PIN 1,2 of the mixer T3. First local oscillator signal is supplied to PIN 3 of T3 from the PLL circuit to convert the RF signals into 21.4MHz first IF signal.

4) IF Circuit

The first signals from Q102 are fed to the matched pair crystal filter FL101, then IF signals are amplified in Q103. And those signals are fed to U101 which is composed of the second local oscillator, second local oscillator, second mixer, limiter amplifier, quadrature detector and active filter circuit. The second local oscillator at 44.845MHz with X 101 and is fed to the second mixer with the first IF signals to convert into 455kHz second IF signals.

5) Audio and squelch Circuit

The detected audio signals are put through a 6dB/oct de-emphasis circuit made up of U604. The signal is then applied to audio power amplifier C5 to obtain enough power to driver the speaker. Part of the recovered noise signal is fed to the integrated operational amplifier inside U101 which makes up an low pass filter. The sensitivity of squelch is adjusted by VR 101.

3. VCO Circuit

The transmit / receive frequency is directly generated by the Colpitts oscillation circuit contains Q402, Q405.