SMC MASTR II NARROWBAND UPGRADE

VHF 19D423249G2 150.8 to 162.0125 MHz Phase Lock Loop

Exciter

The Exciter is a Crystal Controlled (Crystal Frequency x 12) Frequency Modulated, Phase Locked Loop. RF Carrier Stability of +/-0.0002% over the 150.8 to 162.0125 MHz Range of the Exciter is maintained by a phase detector that compares the 3rd harmonic output of the Temperature Compensated (0 to +55 centigrade) Frequency Modulated Integrated Circuit Oscillator Module (2C-FM-ICOM) with the output of the Voltage Controlled Oscillator and makes instantaneous phase and frequency corrections with error voltage applied through a filter/varactor circuit. The 2C-FM-ICOM is modulated by the output of the Audio Processor Circuit, producing Direct FM equivalent to the output of the audio processor.

The Audio Processor Circuit (19C321542G2) provides approximately 24dB gain along with pre-emphasis, limiting, and post-limit filtering. The MOD ADJ control (R104) on the exciter board is set for a deviation of 2.0 kHz deviation. The CG MOD ADJ control (R103) is set for .375 kHz deviation. Total system deviation is set at or below 2.5 kHz.

The modulated output of the 2C-FM-ICOM is applied to the Bandpass Filter (19B226748G2) which passes only the 3rd harmonic, which is amplified and fed to the Phase Detector (U101) for comparison with the divided and filtered output of the Voltage Controlled Oscillator. Any differential voltage is amplified and used to correct VCO frequency or phase error.

The amplified differential voltage used to control and correct the VCO is monitored by a Lock Detector circuit which removes the 10V control voltage from the RF amplifier of the exciter if the VCO goes out of lock.

With the VCO in lock and 10V PTT voltage present, the FM modulated Carrier signal is amplified and delivered at a minimum level of 250 milliwatts to output jack J101.