HT-1000 Theory of Operation

A. Audio

Input from the microphone is amplified by Q1, Q2, U1 and associated components. VR1 is user adjustable and varies the gain from 0 to 26 dB. U2A is a high pass filter with a cutoff frequency of 80 Hz. C11, R17 and R18 provide pre-emphasis at 50 microseconds. U4 is a 2:1 compressor that is used for noise reduction. The high frequencies are routed through U4B and the low frequencies through U4A. U3, Q3 and associated components comprise a modulation limiter. U3A detects positive peaks and U3B detects the negative. The resulting current turns on Q3 which then reduces the gain of U4. U2B is a low pass filter with a cutoff frequency of 30 kHz. VR4 is used to set the level of an ultrasonic tone used for squelch coding. VR3 is used to set the frequency deviation.

B. RF Output

HY1 is a VCO that runs at the output frequency. No multiplication takes place in the RF chain. Q4, Q5, Q8 and Q10 buffer and amplify the carrier. C62, C63, C64, L12 and L13 form a matching network and low pass filter. Q6 and Q9 are used to control the current through the amplifier section. Q7 is used to switch the amplifier on after the synthesizer achieves lock.

C. Synthesizer

U5 is a PLL that is serially loaded from microprocessor U104. RF from the VCO is fed to the PLL via C38 and R48. Y101 provides the reference frequency for U5. VC101 is used to set this to exactly 16 MHz. U5 controls the VCO through the loop filter consisting of R46, R47, C39, C40 and C41. Modulation is fed to the bottom of C39.