

WT-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 40 dB. U2A is a high pass filter with a cutoff frequency of 80 Hz. C102, R102 and R103 provide pre-emphasis at 50 microseconds. U101 is a 2:1 compressor that is used for noise reduction. The high frequencies are routed through U101A and the low frequencies through U101B. U102, Q101 and associated components comprise a modulation limiter. U102A detects positive peaks and U102B detects the negative. The resulting current turns on Q101 which then reduces the gain of U101. U103A is a low pass filter with a cutoff frequency of 30 kHz. VR102 is used to set the level of an ultrasonic tone used for squelch coding. VR101 is used to set the frequency deviation.

B. RF Output

HY101 is a VCO that runs at the output frequency. No multiplication takes place in the RF chain. Q102, Q103, Q106 and Q108 buffer and amplify the carrier. C155, C156, C157, L109 and L110 form a matching network and low pass filter. Q104 and Q107 are used to control the current through the amplifier section. Q105 is used to switch the amplifier on after the synthesizer achieves lock.

C. Synthesizer

U105 is a PLL that is serially loaded from microprocessor U5. RF from the VCO is fed to the PLL via C131 and R129. Y1 provides the reference frequency for U105. VC1 is used to set this to exactly 16 MHz. U105 controls the VCO through the loop filter consisting of R126, R127, C132, C133 and C134. Modulation is fed to the bottom of C132.