REV-PH Theory of Operation

A. Audio

Input from the microphone is amplified by U1 and associated components. U2 is a digital potentiometer that is controllable via a user menu. It varies the gain from 0 to 27 dB in 3dB steps. Q1 is a high pass filter with a cutoff frequency of 80Hz. C11, R14 and R15 provide pre-emphasis at 330 microseconds. U3 is a 2:1 compressor that is used for noise reduction. 330 microseconds of pre-emphasis are also used to feed the rectifier input of U3. An additional 50 microseconds of pre-emphasis is provided by C22, R24, R25, and R26. U4B is also used as a modulation limiter. This stage is simply allowed to clip and no gain reduction is employed. U15 is a low pass filter with a cutoff frequency of 30 kHz. VR2 is used to set the level of an ultrasonic tone used for squelch coding. VR1 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. Q6, Q9, and Q11 buffer and amplify the carrier. C75, C76, C77, L7 and L8 form a matching network and low pass filter. Q10 is used to control the current through the amplifier section. Q5 is used to switch the amplifier on after the synthesizer achieves lock.

C. Synthesizer

U14 is a PLL that is serially loaded from microprocessor U12. RF from the VCO is fed to the PLL via C63 and R77. Y1 provides the reference frequency for U14. VC1 is used to set this to exactly 4 MHz. U14 controls the VCO through the loop filter consisting of R74, R75, C58, C59 and C60. Modulation is fed to the bottom of C59.