

## NHTU Operational Description

### A. Audio

Input from the microphone is amplified by U1B. VR1 is user adjustable and varies the gain from 0 to 40 dB. C14, R19 and R20 provide pre-emphasis at 50 microseconds. U2A is a 2:1 compressor that is used for noise reduction. A modulation limiter is formed by Q1-Q6 and associated components. Q4 detects positive audio peaks and negative peaks are handled by Q3, Q5, and Q6. The resulting current charges C8 and turns on Q1 and Q2, attenuating the incoming audio. VR2 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. Q7, Q8, and Q11 buffer and amplify the carrier. C47, C48, C49, L9 and L10 form a matching network and low pass filter. Q10 is used to control the current through the amplifier section. Q9 is used to switch the amplifier on after the synthesizer achieves lock.

### C. Synthesizer

U4 is a PLL that is serially loaded from microprocessor U3. U3 monitors S3, the channel selection switch, and loads new data into U4 if the switch is changed. RF from the VCO is fed to the PLL via C34 and R34. L11 removes reference components coming out of U4. Y1 provides the reference frequency for U4. VC1 is used to set this to exactly 4 MHz. U4 controls the VCO through the loop filter consisting of R35, R36, C31 and C32. Modulation is fed to the bottom of C31.