

## THEORY OF OPERATION

### Narrow Band Radio

The VCO is modulated by a four level Pulse Amplitude Modulated (PAM) signal. The symbol rate is half the bit rate or 6,000 symbols per second. The modulating signal is Nyquist filtered with an excess bandwidth factor ( $\alpha$ ) of 0.7. The deviation for the four levels is -2500 Hz, -833 Hz, 833 Hz, and 2500 Hz. Data packets are prefaced by a 67 ms preamble. The preamble modulates the VCO with a 3000 Hz sine wave with 2.5 KHz peak deviation. Data in the packets is randomized using shift register feedback.

### Wide Band Radio

The VCO is modulated by a four level Pulse Amplitude Modulated (PAM) signal. The symbol rate is half the bit rate or 11,025 symbols per second. The modulating signal is Nyquist filtered with an excess bandwidth factor ( $\alpha$ ) of 0.7. The deviation for the four levels is -4000 Hz, -1333 Hz, 1333 Hz, and 4000 Hz. Data packets are prefaced by a 36 ms preamble. The preamble modulates the VCO with a 5513 Hz sine wave with 4 KHz peak deviation. Data in the packets is randomized using shift register feedback.