

Phase Locked Loop Oscillator

Phase locked loops allows the generation of a variety of output frequencies as ratios of a single crystal oscillator reference frequency. They are often used to generate the local oscillator signals for the 'up and down' conversion of the RF signal, as in the TS-440 transceiver. They are also used to generate FM modulation by having the speech signal added to the filter output to the VCO.

Each voltage controlled oscillator (VCO) is placed within a *phase-locked loop* (PLL), where a phase/frequency detector (PFD) compares a fed back frequency with a divided-down version of the crystal frequency. The PFD's output current pulses are filtered and integrated to generate a voltage. This voltage causes the voltage-controlled oscillator to increase or decrease the output frequency so as to drive the PFD's average output towards zero. This forces the oscillator frequency to be a chosen ratio of the very steady crystal frequency.

