

UM700 Frequency Stabilization, Power and Spurious Limiting

The UM700 is a frequency synthesized transmitter. The frequency is referenced to a 4 MHz crystal, PCB # 17293, XT1. XT1 is a high accuracy temperature stable crystal. The synthesizer IC, PCB # 17292, U4 provides a lock detect signal. The microprocessor(PCB # 17293, U8 continuously monitors the status of the lock detect signal. In the event of the synthesizer going unlocked, the microprocessor shuts down the RF power by disabling the I/Q modulator(PCB # 17292, U3) via the RF_MUTE signal.

Emissions that are close in frequency to the carrier are attenuated by 5 pole bessel filters(PCB # 17292, U13, U2, U12) that filter the I/Q voltages that are applied to the quadrature modulator(U3). These bessel filters, in addition to the nominal 240 Kbps data rate, limit the occupied bandwidth to less than 180 KHz. The nominal 3 dB cut-off frequency for the bessel filters is set to 55 KHz.

Since the carrier frequency is generated via a frequency doubler, RF emissions exist at one half the carrier frequency. These emissions are suppressed in the VCO(PCB # 17298) by two frequency doublers(U14(Q2), and Q1) tuned to the RF carrier frequency.

Harmonics of the carrier are generated in the final RF power amplifier(PCB # 17292, U1). This stage is operated at 1 dB below its 1 dB compression point. L5, and C15 provide attenuation of harmonics. The isolator, ISO1, also provides attenuation of spurious emissions. In addition, a diplexing network consisting of C10, L16, C1, L17, and R16 provides a very broadband match for U1, further attenuating higher frequency harmonics(greater than 1.5 GHz) and stabilizing U1.