Theory of Operation – Radio System
Qualifier X-Ray
Vehicle Mounted Device (VMD)

Part 90 Transmitter

RF Generation and Amplification – Signal Path Description

RF energy is produced by a voltage controlled oscillator at Q2 (and associated passive components). The RF energy from the VCO is amplified by a buffer stage at U3, the driver pair at Q7 and Q9, then finally by the output transistor Q5.

The RF signal passes through a low-pass filter before connecting to the external antenna jack.

RF Power Control

The overall RF output level is limited by the intrinsic gains of each sequential active RF amplification device, from the VCO all the way to the final RF amplifier.

Output Frequency Control

A VCO correction voltage is supplied by a PLL IC at U2 for tuning the VCO's tank circuit.

The PLL reference frequency is generated by a crystal and internal (to the PLL IC) oscillator at 16.8 Mhz. The PLL's internal registers are programmed by the microcontroller (at U6) to provide one of three operating frequencies: 27.45 MHz, 27.47 MHz, and 27.49 MHz.

Part 15 Receiver

The receiver, aside from an input filter and crystal reference, is totally contained within a single IC at U8 (U3745BM). This receiver passed the recovered data stream to the microcontroller at U6 (MC68HC908QY2).