TriScanner:
Metal Mode

The metal detector sensor is a high Q resonant LC oscillator operating at 80 kHz whose gain is adjusted by the PIC processor to provide just enough gain to sustain oscillation. When operating in this "gain-starved" mode, the presence of metal will de-Q or load down the oscillator and reduce the level. This reduction of level is detected by the PIC processor and translated into LED segments on the display.

The LC oscillator consists of the emitter-coupled pair Q3 and Q4, the inductor sensor coil and capacitor C4. Gain of the oscillator is controlled by the current source, Q2, which is controlled by the PWM voltage. Q2 acts as a high impedance buffer and level shifter for the PWM. Amplifier U3A provides a two times buffer for the oscillator. Q6 and C6 form an AC to DC converter which converts the 0 to 5V pk AC oscillation level to approximately 1.9 to 4.3 V DC signal.