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HIGH SENSITIVE METAL DETECTOR FOR DETECTING METAL OBJECTS

(Better Security System for to Detect Terrorists / Human Bombs)

One of the simplest methods of metal detecting is by beat frequency oscillator. Basically, the circuit consists of two balanced oscillator. One oscillator provides the reference signal, and other oscillator is acting as the detector element. The reference oscillator's frequency is fixed, while the detector oscillator is variable depending on the presence of a metal. The reference oscillator can be constructed using various circuit topologies: inductor-capacitor (LC) Colpitts oscillator. While the reference oscillator can be implemented using various circuit topology, the detector oscillator always use inductor-capacitor topology, because the mechanism will be using the magnetic induction property of the detected object, and the inductor component of the detector oscillator will be the detecting probe.

With the absence of a metal near the detector probe (the inductor component of the detector oscillator), the detector oscillator is tuned to have same frequency as the reference oscillator. The output of the detector oscillator and the reference oscillator output is mixed using heterodyne mixer circuit, producing a beat frequency output of zero Hz, or a very low frequency if both oscillators is slightly unbalanced. In the presence of a metal near the detector probe, the detector oscillator will shift it's frequency, and the mixer output will produce a tone with frequency equal to the difference of the reference and the detector frequency.

This project uses regulated 12V, 750mA power supply. 7812 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/18V step down transformer.

