# My Metal Detector Project

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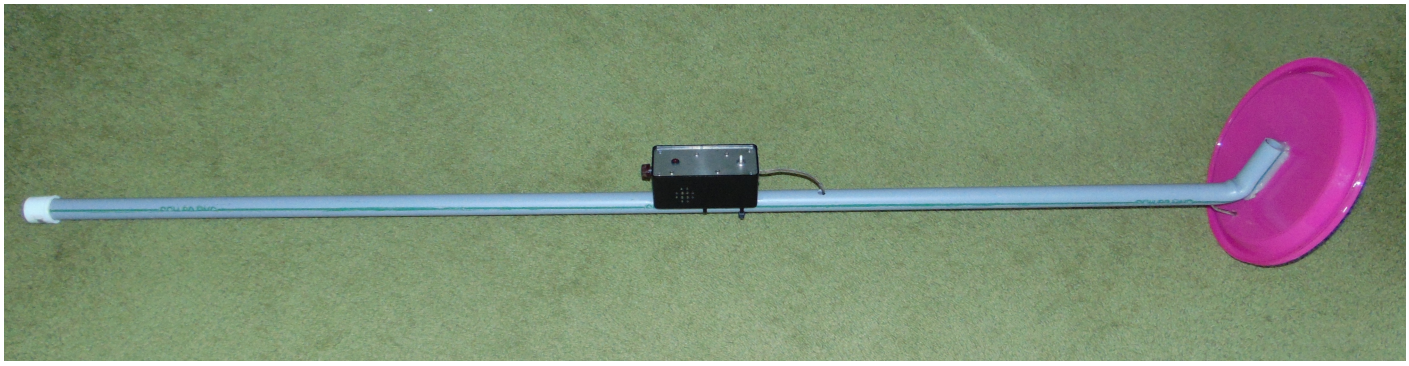
I was interested in building a simple metal detector for finding lost metal objects in my yard. While surfing the internet I came across a very creative design at the website www.digiwood.ee. It uses a PIC micro-controller to implement most of the critical circuitry for a complete metal detector using the PI (Pulse-Induction) principle. A large MOSFET is used to charge the sense coil, and power is supplied by 4 penlight batteries (rechargeable NIMH only). I ordered the complete kit from the website, assembled it, and it worked right away.

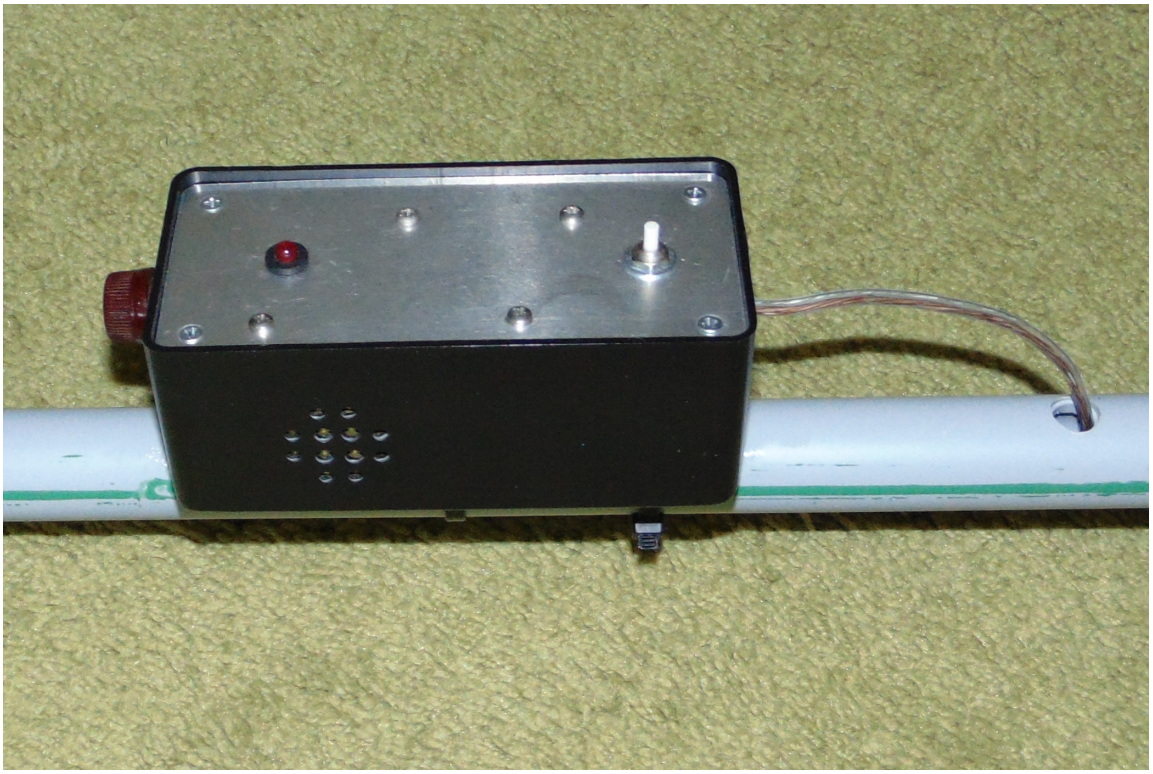
In order to have a large enough search coil I created a coil of pancake design woven in a “spider web” fashion. He is a photo of the field coil:

Note that the coil is mounted between 2 plastic dinner plates on the end of a PVC pipe. The coil is woven on an 9 inch diameter cardboard disk with 9 (equidistant) slots cut into it. By doing an odd number of slots, weaving in and out around the circumference causes odd and even turns to have the opposite weave, thus minimizing capacitance between windings. The coil has 23 turns on it, of AWG no. 20 stranded wire with plastic insulation.

Winding a coil in this fashion gives an excellent field distribution as well as good depth. I used stranded speaker wire of AWG no. 16 gauge to minimize resistance in series to the coil from where the control box and circuit is located on up the handle. About 28 inches length of this wire is used between the coil and the control PCB. Note that it is important to minimize coil resistance in order that the coil current can be high enough for good sensitivity. The field strength is proportional to n times I, where I is the current and n is the number of turns, hence it is important to have the current as large as possible.



The complete metal detector “stick” is shown above. It’s easy to wave this around and scan for metallic objects.



Here is an expanded image of the control box enclosing the PIC circuit on the 2 layer PCB, the piezo speaker. As well I added an earphone jack, and a series variable resistor to control earphone audio.