

"Gary's Pulse Induction Metal Detector"

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Features Either a Single Coil Metal Detector,
Or 2 possible Dual Coil Configurations! You Choose which.

Note, A Possible Problem: "R17" (470 Ohm) Can break down because of the sharp spikes it receives.
Symptoms: Detector Doesn't Work and you are Unable to adjust VR1 and obtain a sustained constant voltage.
Probably R17 has gone to a High Resistance.
This only seems to occur if the detector is run Continuously for Many Hours at one time.
So Far, I have only seen 3 Failures occur from this problem.

Cure: Replace it and re-adjust VR1.
Ideally R17 would be a Wirewound type resistor, but that isn't available in a small 1/4 watt Resistor.

***Click Here,** Pictures of My Metal Detector Project, Built by Others

***Click Here,** Some Comparison Test Results, by Dave in Australia

Warning: I **Do Not** Recommend this project for the **"Beginner"**,
It definitely Requires **Good Soldering Skills** and at least a basic working knowledge of electronics is very helpful.

Before Testing the Completed Unit

Wash the board to Remove All Flux Residue.

IT WILL NOT WORK CORRECTLY IF YOU DON'T!

It is Also Recommended to use a Current Regulated Power Supply when first testing this unit.
(Less than 300 Ma. is quite satisfactory)

Excessive Current, generating heat, will Destroy the REG1117A.

Failing a Regulated Supply, a 60 Watt/110 volt standard light bulb can be placed in series with the positive battery lead. This should limit current to a reasonable level, preventing any damage to parts. **(Where only 220 volt bulbs are available, use a 150 watt bulb or two 75 watts in parallel works well.)**

I Repeat, Good Soldering is a Must!

However, If you build this project and have problems, I will offer you as much assistance as possible in e-mails, Even to the extent of Free Repairs, Not Including Postage Charges and Possibly subject to replacement parts cost. (No parts charges will be made, without prior confirmation from that person, and most I haven't even

charged for the parts.)

NOTE: It is Important to use a Good Soldering Iron, Rated at 15 to 25 Watts and having a Small Clean Tip!

Note also the Revision Dates on All My Articles.

Always check for changes, I update most articles quite regularly.

Note: This metal Detector was Not specifically designed to Detect Gold Nuggets.

Additionally, The only metal that I have found that my metal detector will NOT DETECT is some Better Qualities of "Stainless Steel". I Didn't know why!

Here is a Much Appreciated explanation from one of my readers: Well the reason why you can't detect it is because the conductivity of Stainless is very low. This is true for all pulse induction metal detectors. Because of the low conductivity, the eddy currents have disipated by the time the pulse delay has ended and you begin to sample the signal. The lower the conductivity of the metal, the faster the eddy currents disipate. If I remember right the conductivity of copper is 100, the conductivity of stainless steel is about 1.3 or so. The conductivity of silver is 108 so its the best on range. Gold is in the 60 to 80 range depending on the alloy. The longer the pulse delay on your detector is, the less likely you will be able to pick up lower conductive metals. Hope this helps. Good luck, Charles **A Note from me:** Well I was aware of the Delay times, I didn't realize that stainless was so low in conductivity. Thanks Charles!

If You Have PROBLEMS when you build this Unit?
Don't Overlook Anything!



Some Guys Problems

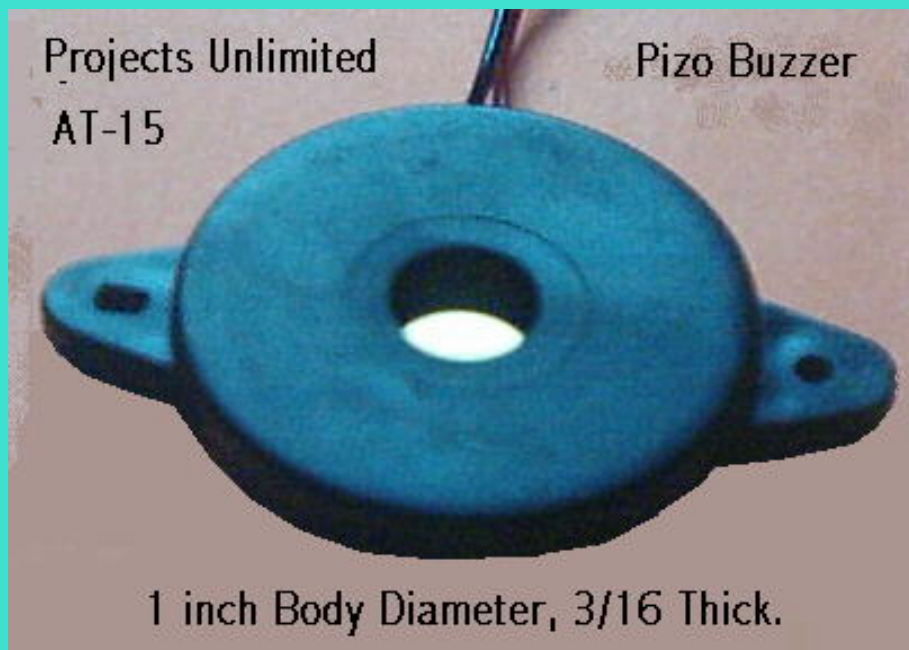
Click Here to read them

****This project is offered totally Free for those who are interested in it. I have tried to make this article as complete as possible, but I will Not assume any lilability for any "Errors or Omissions" in this article.**

If Needed, I will attempt to help you as much as possible with any problems. However I have no control of your abilities or skills, so build it totally at your own risk!

This unit is Extremely Stable, and features three possible configurations with the coils, as listed below.

I can now supply a small Pizo Buzzer that works quite well on this unit.



Cost is \$2.00 US Funds Each, plus postage.

The 3 possible coil Configurations are: 1) First configuration is just a single coil. Good for most applications!
2) Second is a dual coil, with noise and ground effects cancellation.
3) Third is a dual coil, one for transmit and one for receive.

 **Here is A Very Simple Coil that Will Work,**
At least for testing purposes.

 **Here is a Pretty Good Coil,**
and reasonably easy to make. Decades ago this style of coil was used for AM Antennas in some Old Tube Type Radios.

My Recommended Optimum Flat Coil Sizes using 20AWG:

Really Small Objects: ID = 2.62 inches & OD = 6 inches with 52 turns. Coils wound on Ferrite Rods are also good.

Medium Objects: ID = 5.8 inches & OD = 8 inches with 34 turns.
Its Best to use this size coil for finding Coins.

Large Objects: ID = 8.2 inches & OD = 10 inches with 28 turns
ID = 13.6 inches & OD = 15 inches with 21 turns.

ID = 10.4 inches & OD = 12 inches with 25
ID = 39.2 inches & OD = 40 inches with 12
turns.

****A Conventional Kit of parts Is Available if you want it.**

Other than the PCB and coils, most parts are supplied at my Landed Cost.

Just the Circuit Board is also Available, E-mail Me!

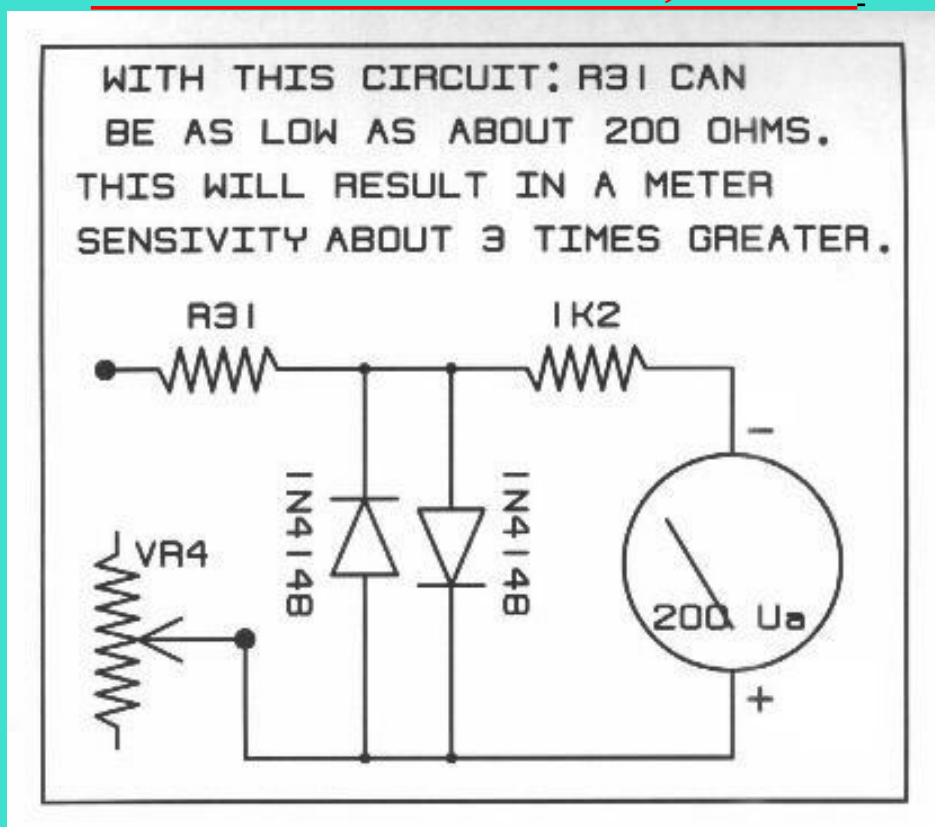
They are Good Quality and are \$12.00 each, Plus Postage. Usually just \$1.00 (Please state which Country you live in, so I can confirm that postage cost)

They are Etched and drilled (269 holes) on 1/32 inch Glass Epoxy Circuit Board with 2 ounce copper. They are "GOOD QUALITY AND QUITE USEABLE".

NOTE: If you live Overseas the "REG117A" may be difficult to obtain. I can supply it for an additional \$4.50 when ordering the PCB.

It would be Greatly Appreciated to recieve Feedback from ALL persons building this Detector. Regardless weither you purchase the Circuit board from me or not! As of May 2003, Well over 200 units have been built with boards from me, and From Replies recieved none have been unsatisfied with it. I am also aware of a few who have built this detector using boards they made themselves.

"Want a More Sensitive Meter, Do This"



These values are for a 200 uA Meter, but if you double the two resistor values for a 100 uA meter or Quadruple these values for a 50 uA meter, this should also work fine.

Latest Update: Feb 23 2007



I can Now Supply these New Vu Meters

These Meters are Rated at 100 uA at the -3 Db and about 240 uA at the + 3Db. The Cost is \$8.00 each, plus Shipping Cost.

"Click on the Titles below to open them"

[Facts about Gold and its detection.](#)



[I now have some Coils for sale!](#)



[A Very Detailed Picture Overlay of the Assembled PCB.](#) This should print OK, horizontally on a 8.5 x 14 paper. [NOTE:](#) On the Newest Circuit Board, [R32](#) is above the IC, Not beside it as shown here.



[A Large Printable Schematic.](#) Re-Drawn Feb 2005, much Clearer and with considerable more Info. [NOTE:](#) When ordering a Kit, I may supply 47 Pf Caps for C19 and C22, instead of the 220 Pf ones.

 [Printed Circuit Board](#)

 [Calibration and Setup Procedures](#) [\(Revised July 01 2003](#)

 [Parts List](#) [\(Revised Mar 6 2006\)](#)

 [Updated Coil Winding Info](#)

 ["UPDATED"](#) [Some technical Info and coil pics, Revised April 5 2004](#)

 [Additional Pictures and More Info](#)
[on my Pulse Induction Metal Detector.](#)

IMPORTANT NOTE

The only claims I will make as to the sensitivity of this unit is: The one I made for myself does detect a Canadian Quarter (made of Nickel) and also an American Quarter at a distance of 12 inches in free air and at a good 10 inches in the soil in my yard.

Additionally, If built correctly: This Metal detector should detect a "Pop Can" at an "Absolute Minimum Distance" of 15 Inches. AND it could get depths to 25 Inches or More, depending on the meter used.

However there are too many Variables in Coil Construction, as well as materials, shapes, sizes and soil conditions to try to predict exactly what other units will do under various conditions.

ADDITIONALLY, Remember This:

THE MOST IMPORTANT THING WITH ANY METAL DETECTOR, IS THE OPERATORS "ABILITIES", "SKILLS" AND "PATIENTS" in using it PROPERLY!

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