

AA-5 to Crystal Set

AI Klase – N3FRQ

2 October 2022

The Mission

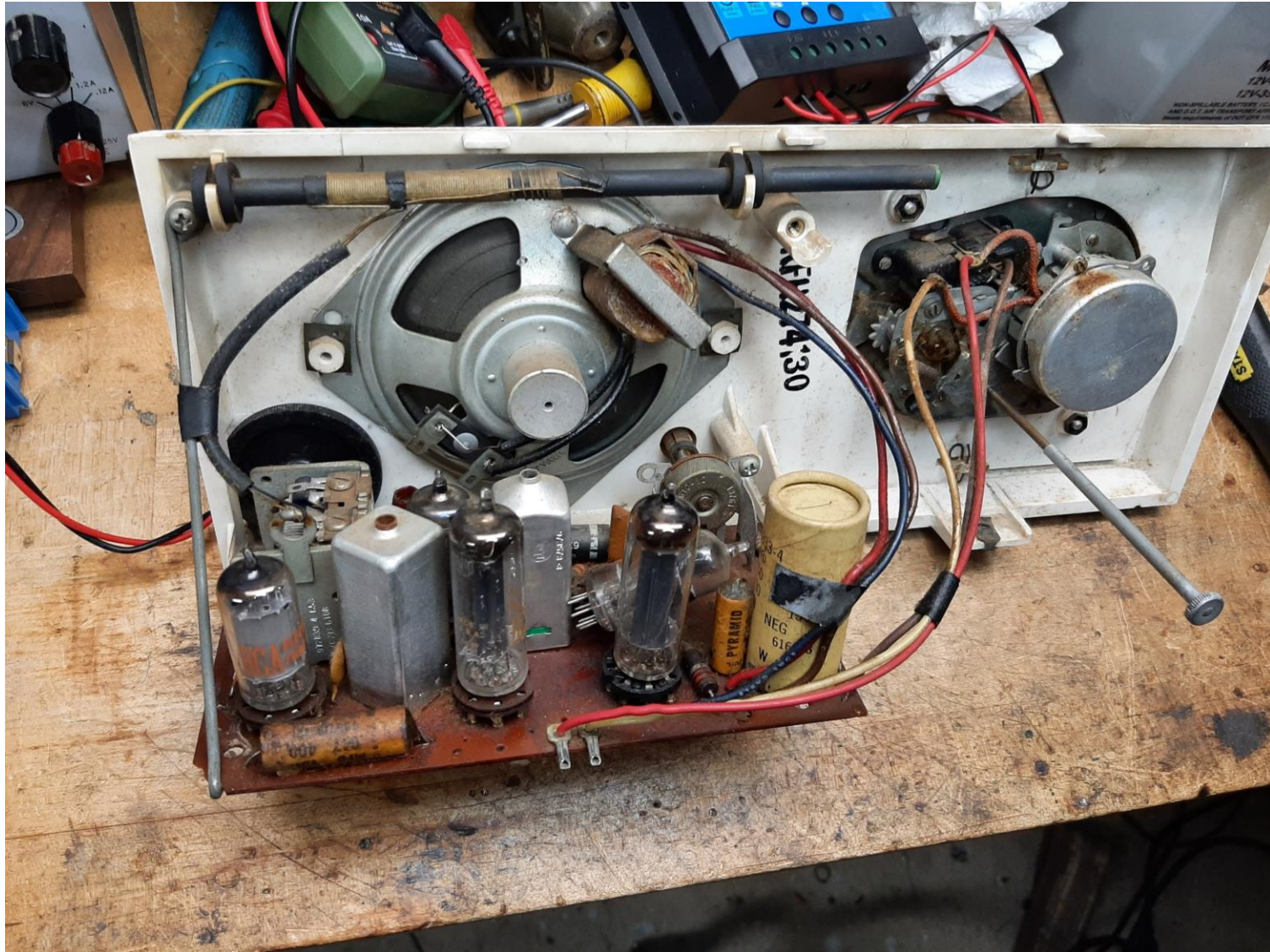
- Build a good crystal set with parts salvaged from an All-American-Five radio.
- There's lots of these around, and the distressed ones are often free for the taking.
- We'll reuse the two-section variable capacitor and ferrite antenna rod for our tuned circuit.
- We'll repurpose the output transformer to enable the use of some dollar-store earbuds. (These are often quite sensitive due to their rare-earth magnets but require impedance matching for use in a crystal set.)

You can do this!

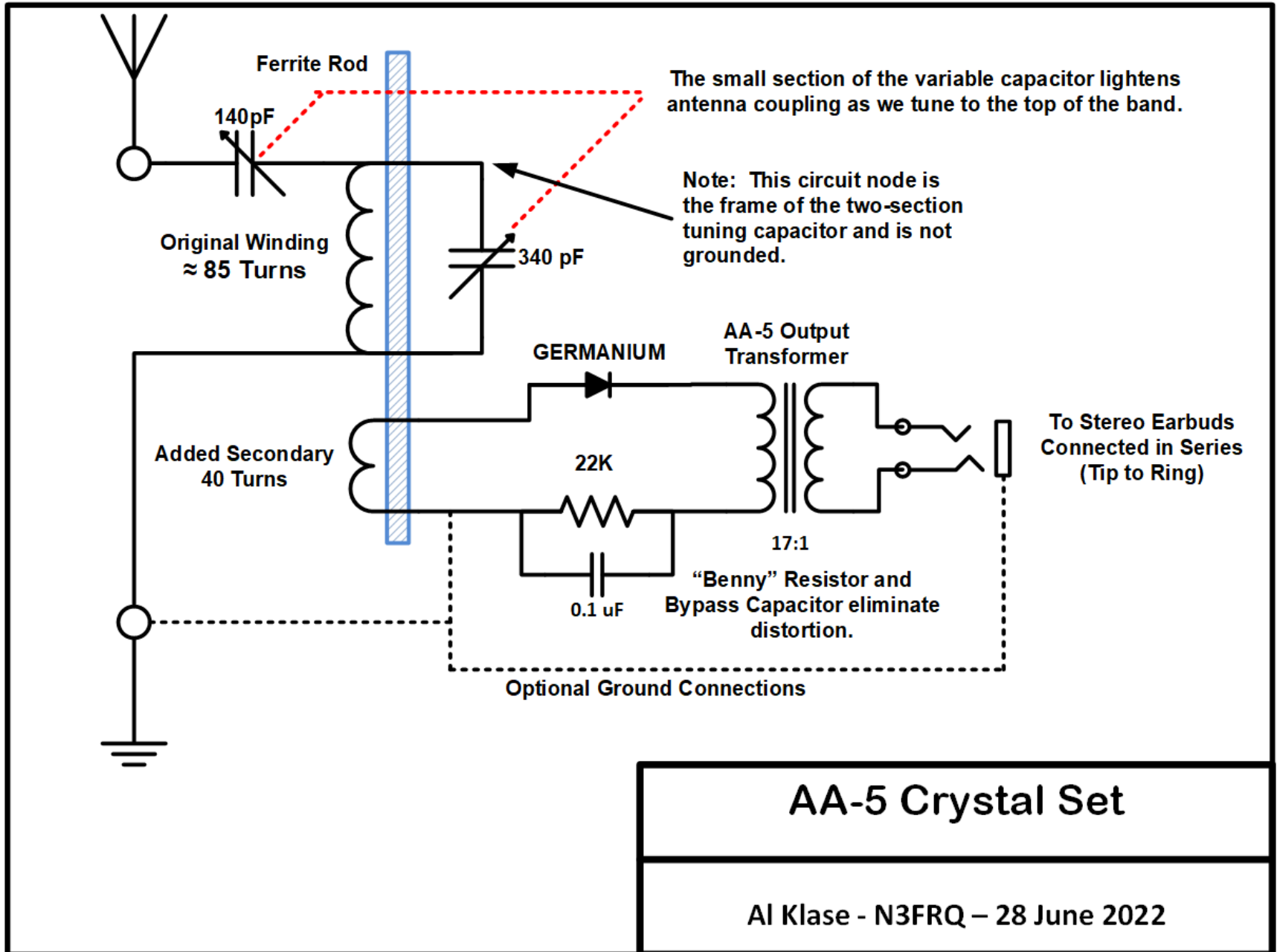
Our Victim



Our Victim

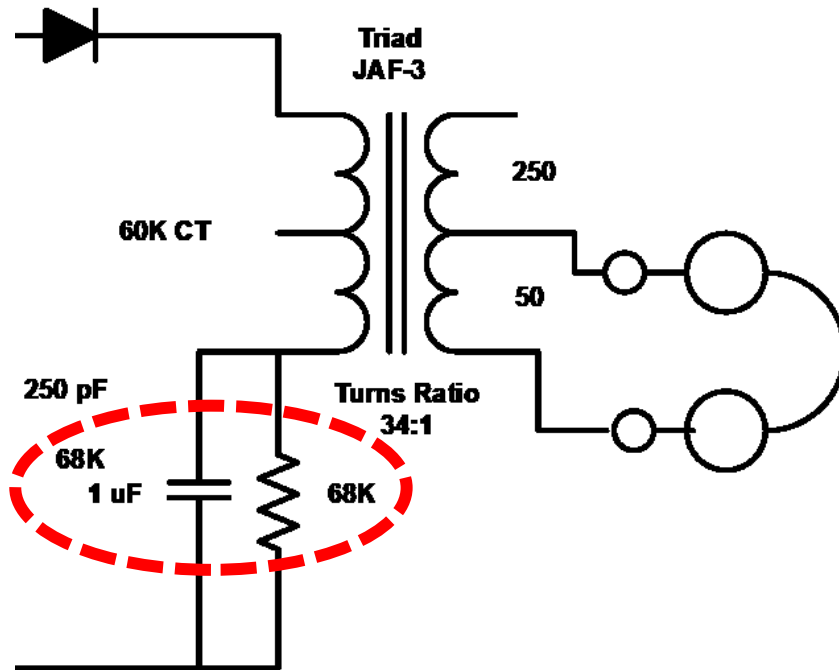


Schematic Diagram



The “Benny” Resistor

- Pointed out by the late Ben Tongue, captain-of-industry, electrical engineer and crystal-set maven.
- The DC resistance of a matching transform primary is much smaller than the AC impedance.
- The heavy DC load on the diode detector causes distortion and loss, especially on strong signals.
- Bypassed resistor in series with the primary solves the problem.

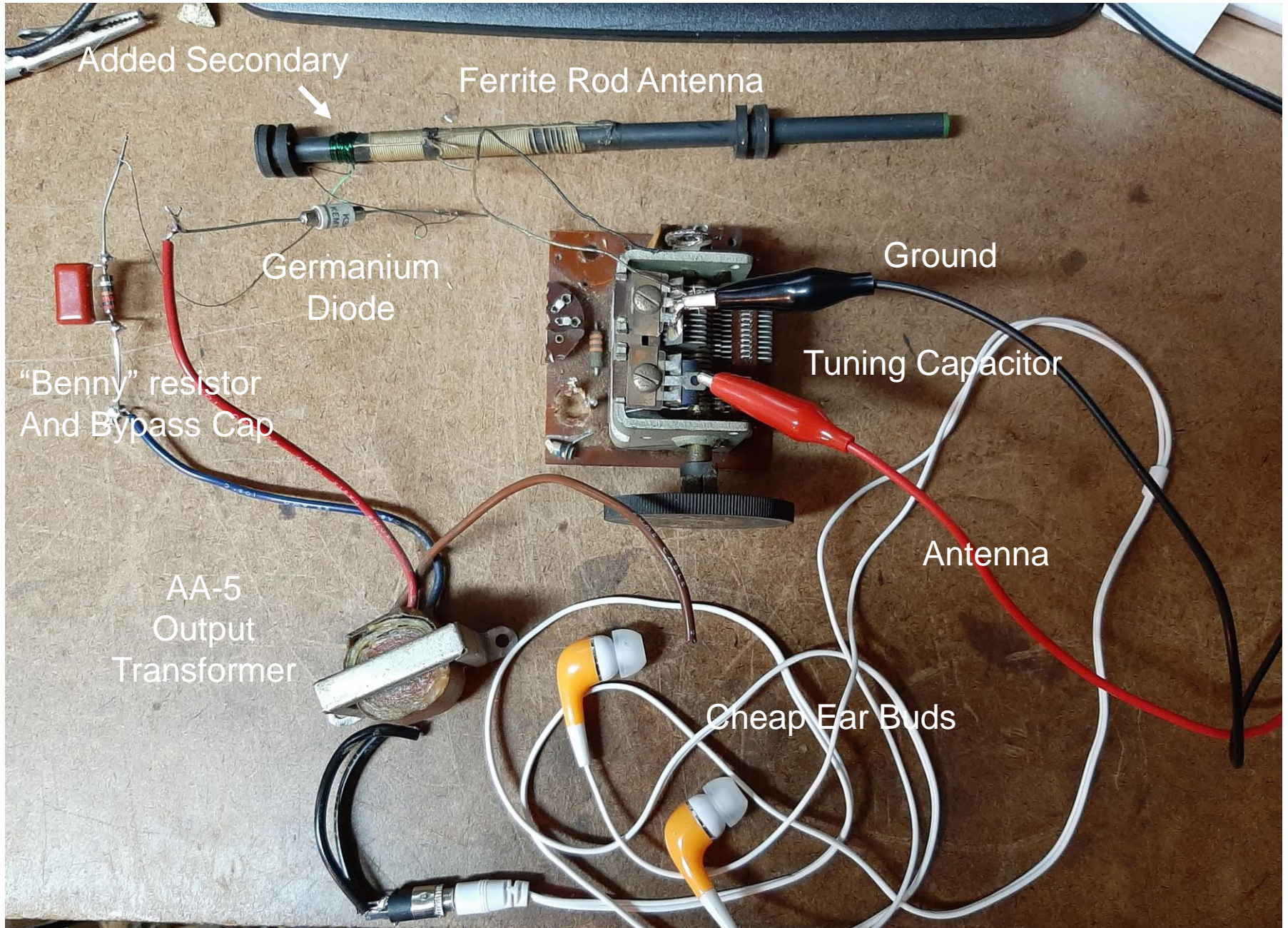


Ben Tongue on Crystal sets



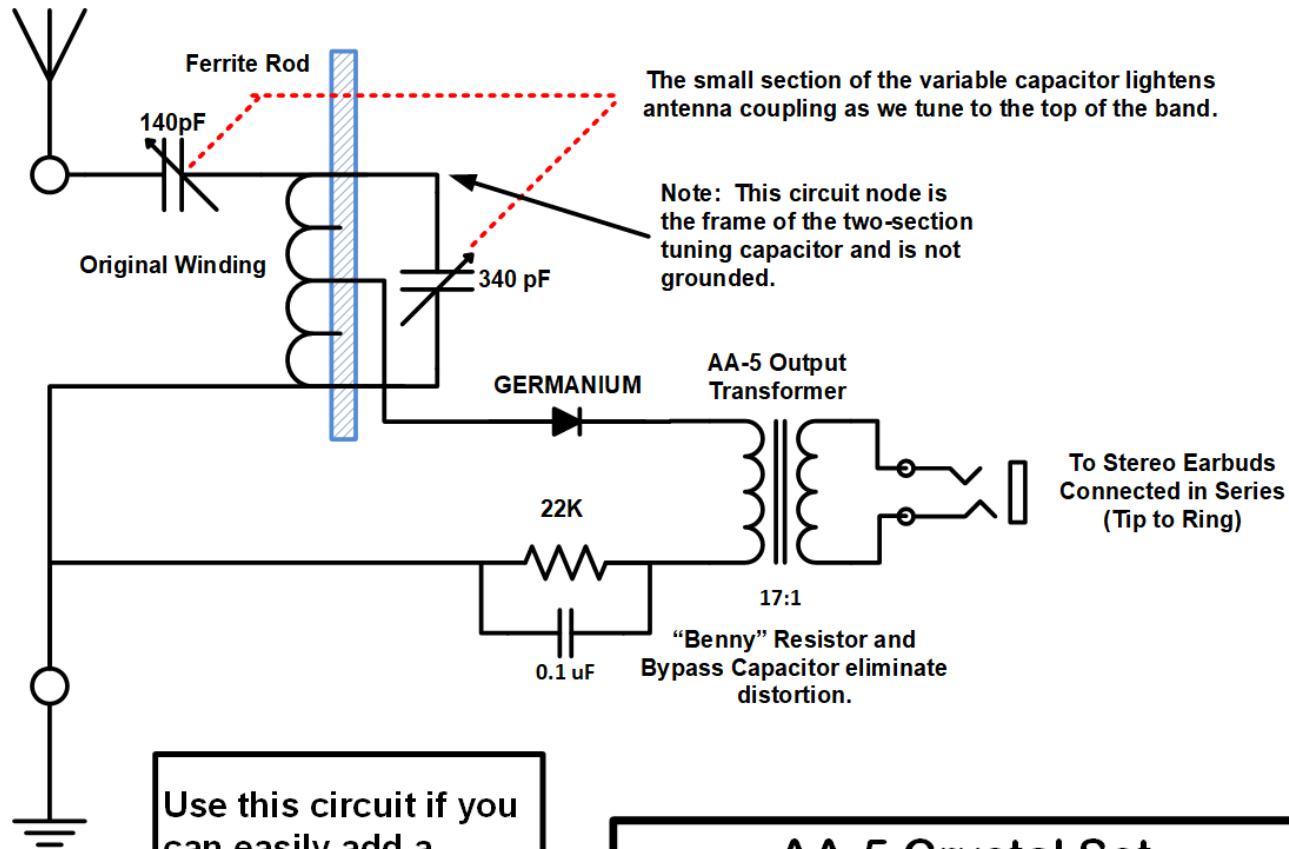
Ben (left) supervising PGXS check out at our 2006 clinic.

Pictorial



An Alternative Circuit

In the case where you can easily add a center-tap to the existing antenna coil this similar circuit can be utilized.



AA-5 Crystal Set

Version 2

Al Klase - N3FRQ – 28 June 2022

Output Transformer

- 0.1 VAC 1 KHz on secondary -> 1.7 VAC on primary
- Therefore: turns ratio = $1.7 \div 0.1 = 17$
- Impedance transformation = $17^2 = 289$
- This is consistent with assuming the transformer provided a 2500 - ohm load to the 50C5 plate (see tube manual) and transformed it to 8-ohms for the speaker.
- So: 67-ohm earbuds look like $289 \times 67 = 19,363$ ohms

Log

AA-5 Crystal Set - Jersey City, NJ - Low 100-foot antenna.

FREQ	CALL	PWR	DX -Miles	Sterngth
1280	WADO	50k/7.2	7	Weak
1190	WLIB	10K/30K	4.9	Weak
1130	WBBR	50k/7.2	6.1	OK
1010	WINS	50K	5.2	OK
820	WNYC	10K/1K	2.5	Very Strong
770	WABC	50K	13	OK
710	WOR	50K	4.9	OK
620	WSNR	2K/7.6K	5.2	OK
570	WMCA	5K	2.5	OK