

Traveling with a Crystal Set

AI Klase – N3FRQ

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Rational

- Years ago, when I did a lot of traveling for business, I developed the eccentric habit of taking a small crystal set along.
- The challenge is to deploy an antenna in a hotel room and catch some local stations with your passive receiver.
- Hopefully, this will expose you to another aspect of our hobby.

Travel Kit



The Skywaves Portable

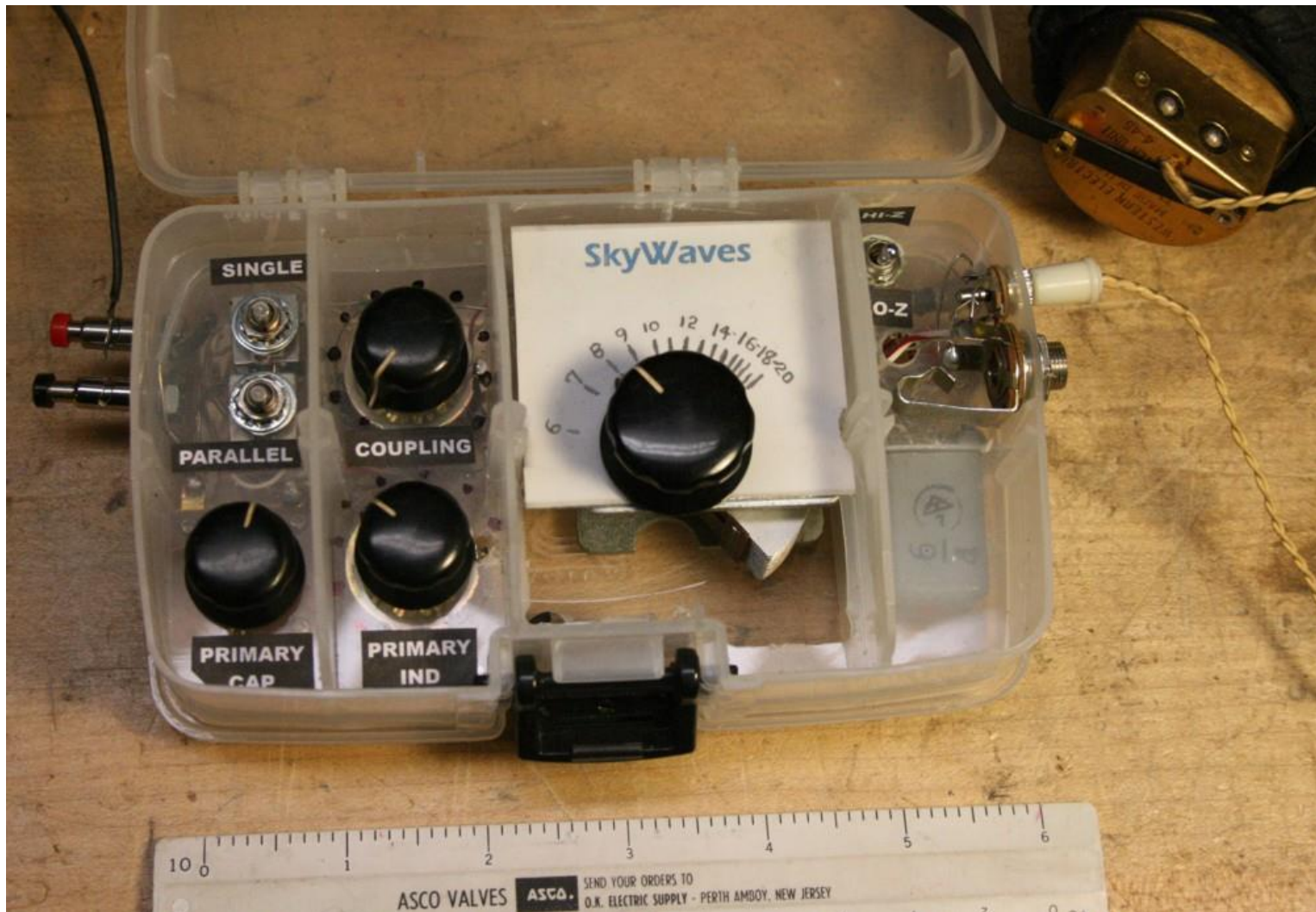
I wanted to build a high-performance pocket-sized crystal set that would give a good account of itself in both weak- and strong-signal environments. The resulting radio has the following features.

- Rugged construction
- Selectable single- or double-tuned operation
- Selectable series or parallel input circuit in double-tuned mode
- “Mid-line” variable capacitor in the secondary circuit
- Accurate dial calibration when secondary tuned circuit is lightly loaded
- Wide-range coupling in single-tuned mode
- Supports both high-impedance and medium-impedance headsets
- Both 1/4-inch and 1/8-inch phone jacks.
- External connection to detector DC-load resistor for signal-strength measurement

Double-tuned sets can be difficult to operate, especially when the nature of the RF environment and antenna-ground system are unknown, hence the inclusion of the single-tuned mode. The tuning coil is provided with a wide range of input taps to accommodate antennas of different lengths.

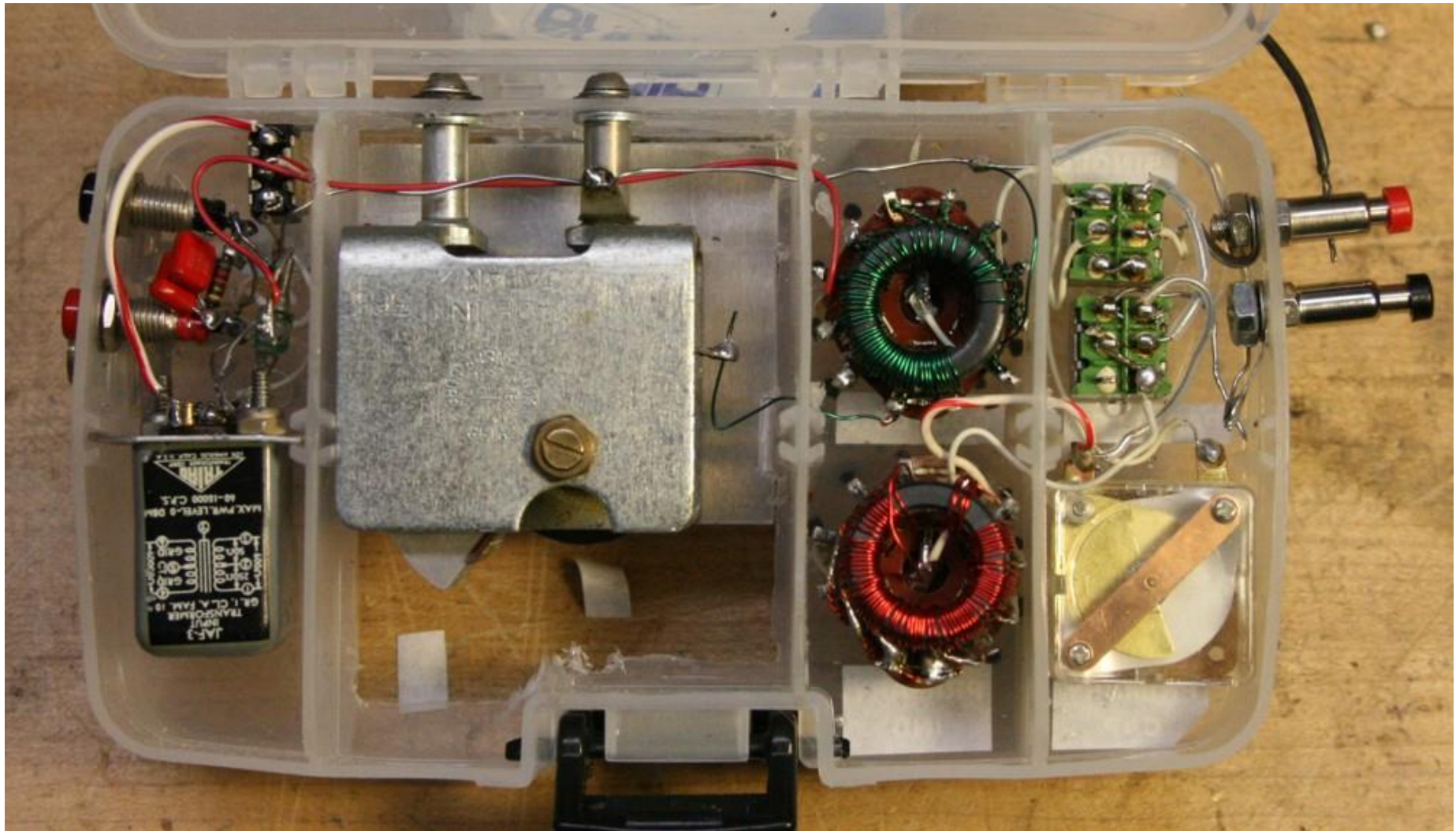
In fact, in a strong signal environment, the set can be operated in the “rocket-radio” mode. The input tap is set to the “top” of the coil, the antenna terminal is connected to a convenient ground, and the headphone cord and operators body serve as the antenna.

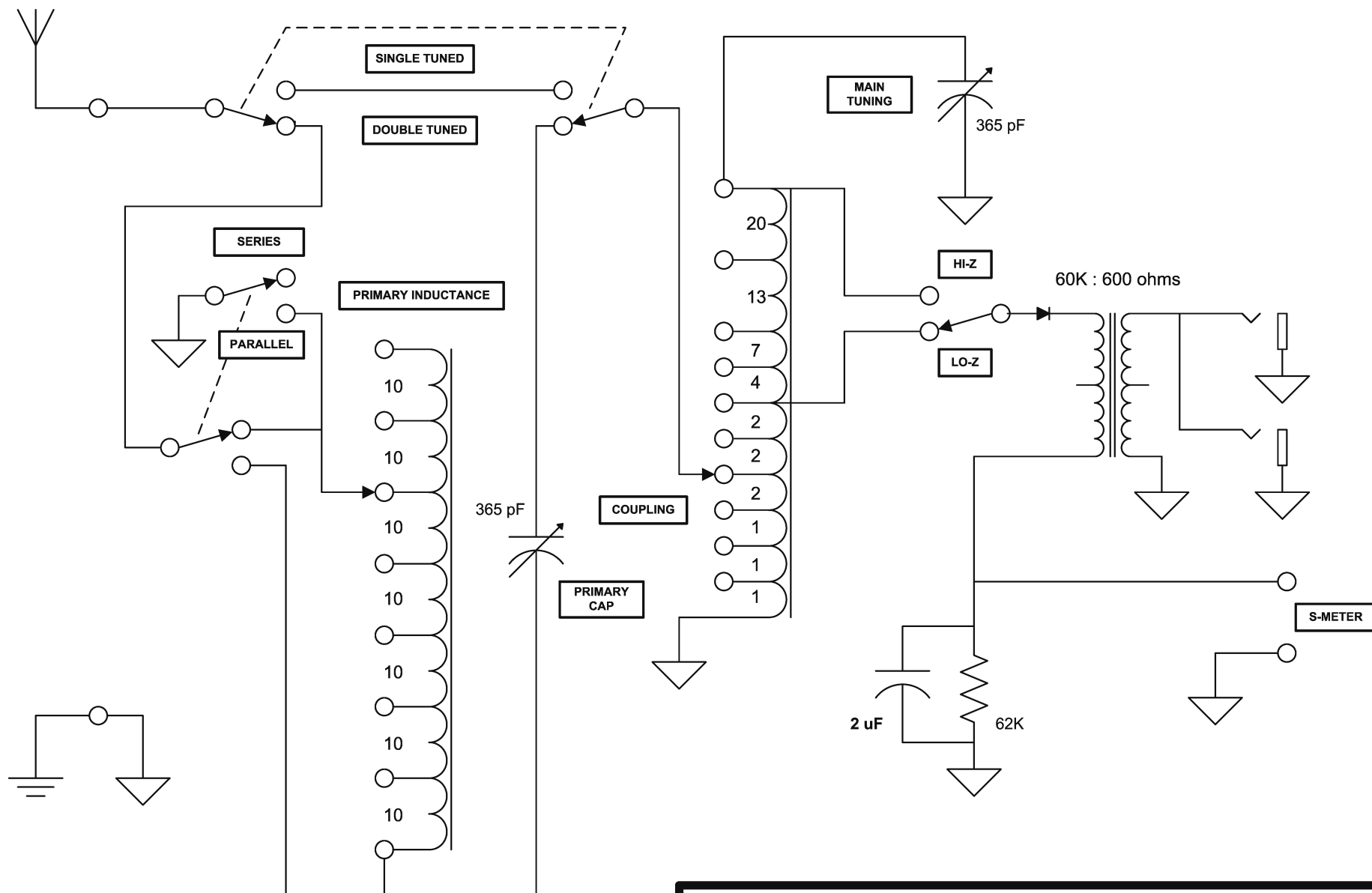
Skywaves Portable - Front



Repurposed Plastic Tackle Box

Skywaves Portable - Back





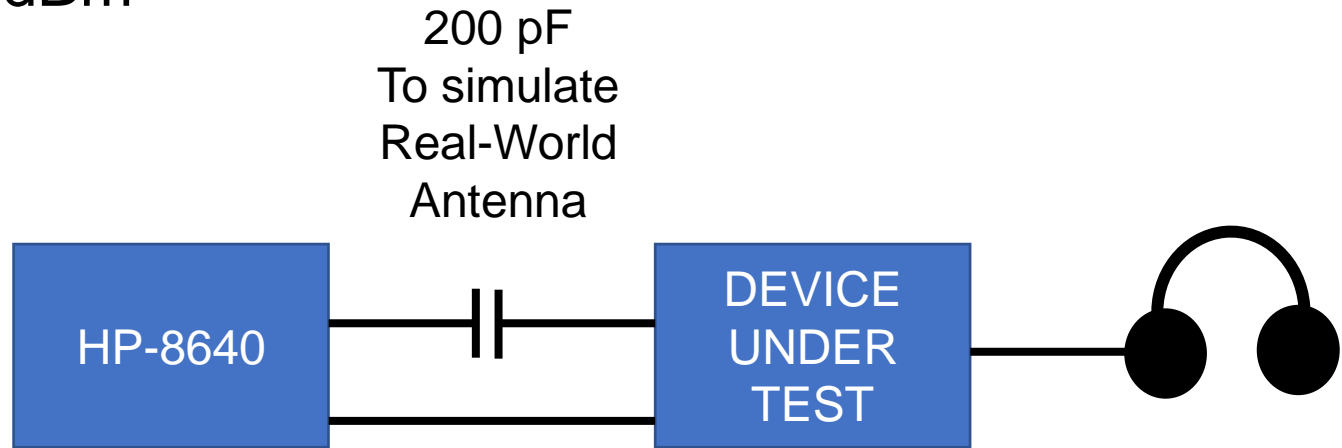
Both coils;
#26 wire on FT-82-61 cores.

**SkyWaves Portable
Research Crystal Radio**

Al Klase - N3FRQ – 3/9/2010

Performance

- Minimum Discernable Signal*
 - 1 MHz, Modulated 1 KHz 30%
 - -58 dBm



* If you can discern a 1 KHz 30% modulated tone, you'll likely be able to just understand speech at 100% Modulation. (Turn the sig-gen output attenuator down another 10 dB, and listen for the signal you think you're hearing to go away.)

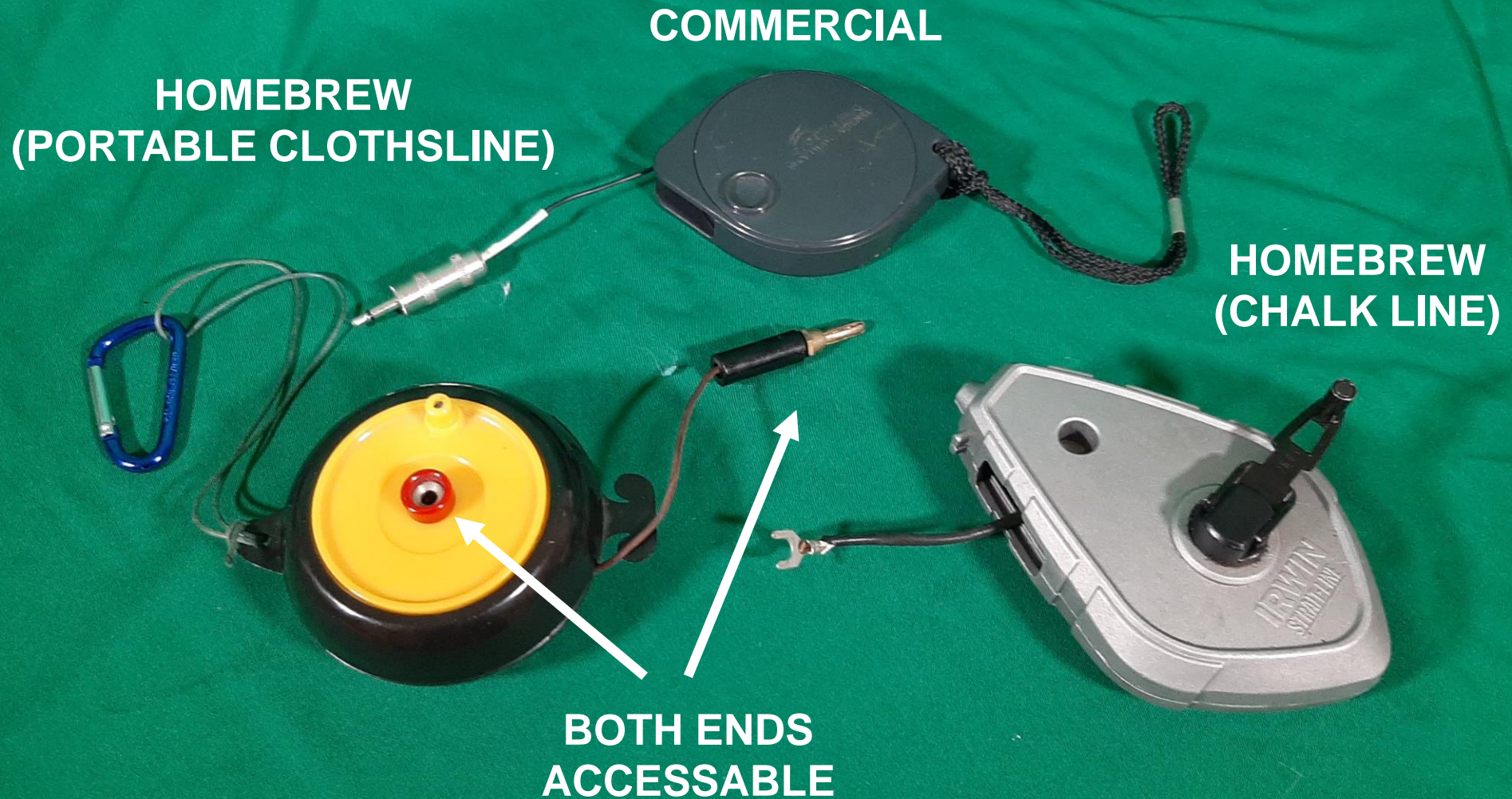
(Keep in mind my hearing is maybe 10 dB down from the way it was 15 years ago.)

6-foot Antenna/Ground Jumpers



3/8" brass tube is a good fit to
an AC outlet ground terminal

Antenna Reels

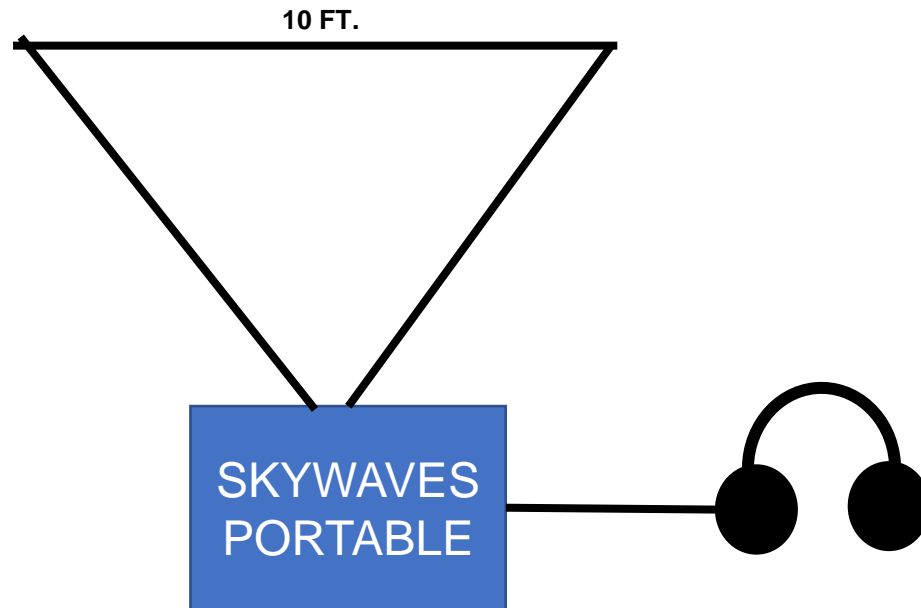


Helpful Accessories

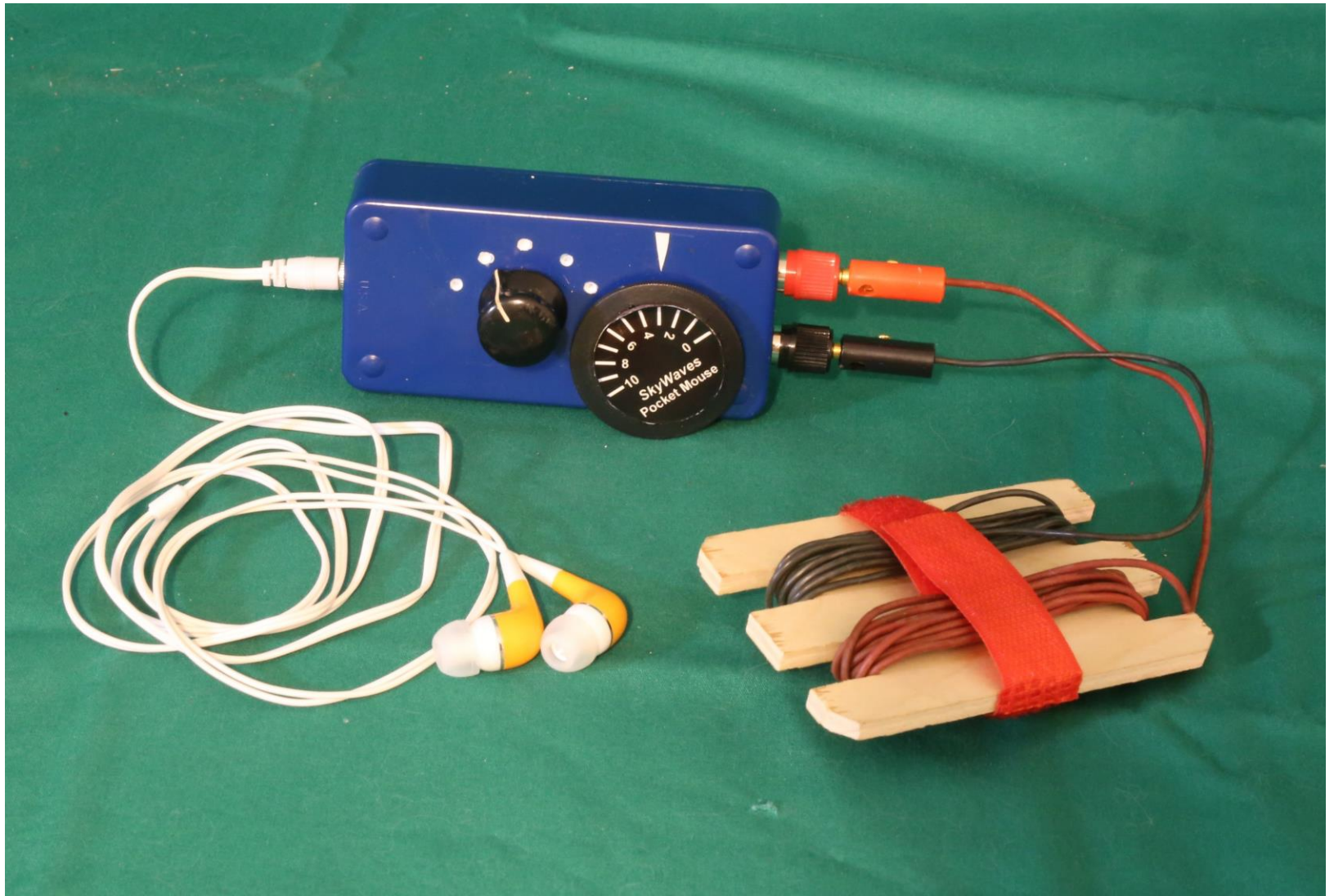


Small Loop Antennas

- A double-tuned set in the series mode can load a loop antenna.
 - Responds to the magnetic component of the wave which penetrates building better.
 - No need for a ground.
 - Dimensions not critical.
 - Try multiple turns.



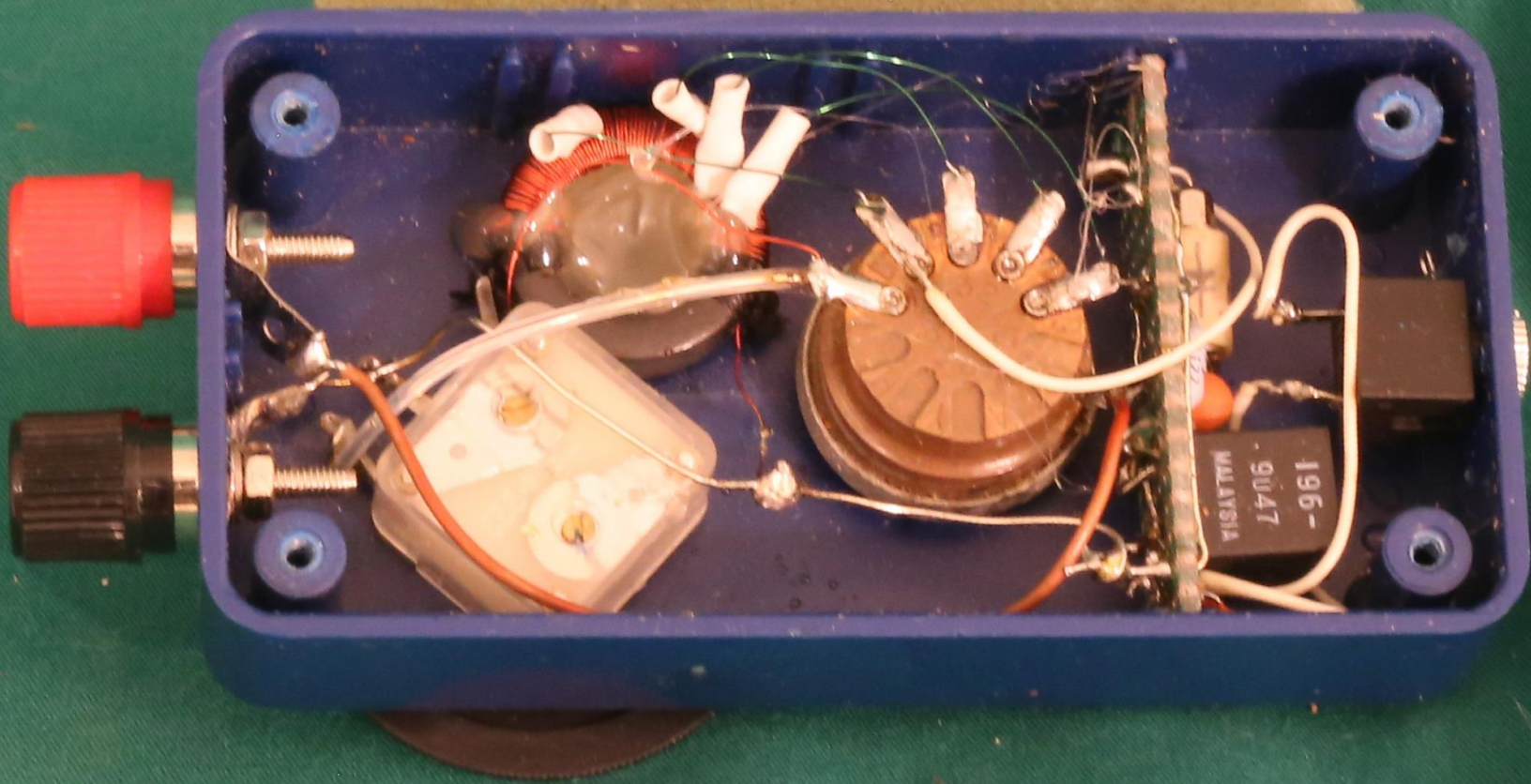
The Skywaves Pocket Mouse

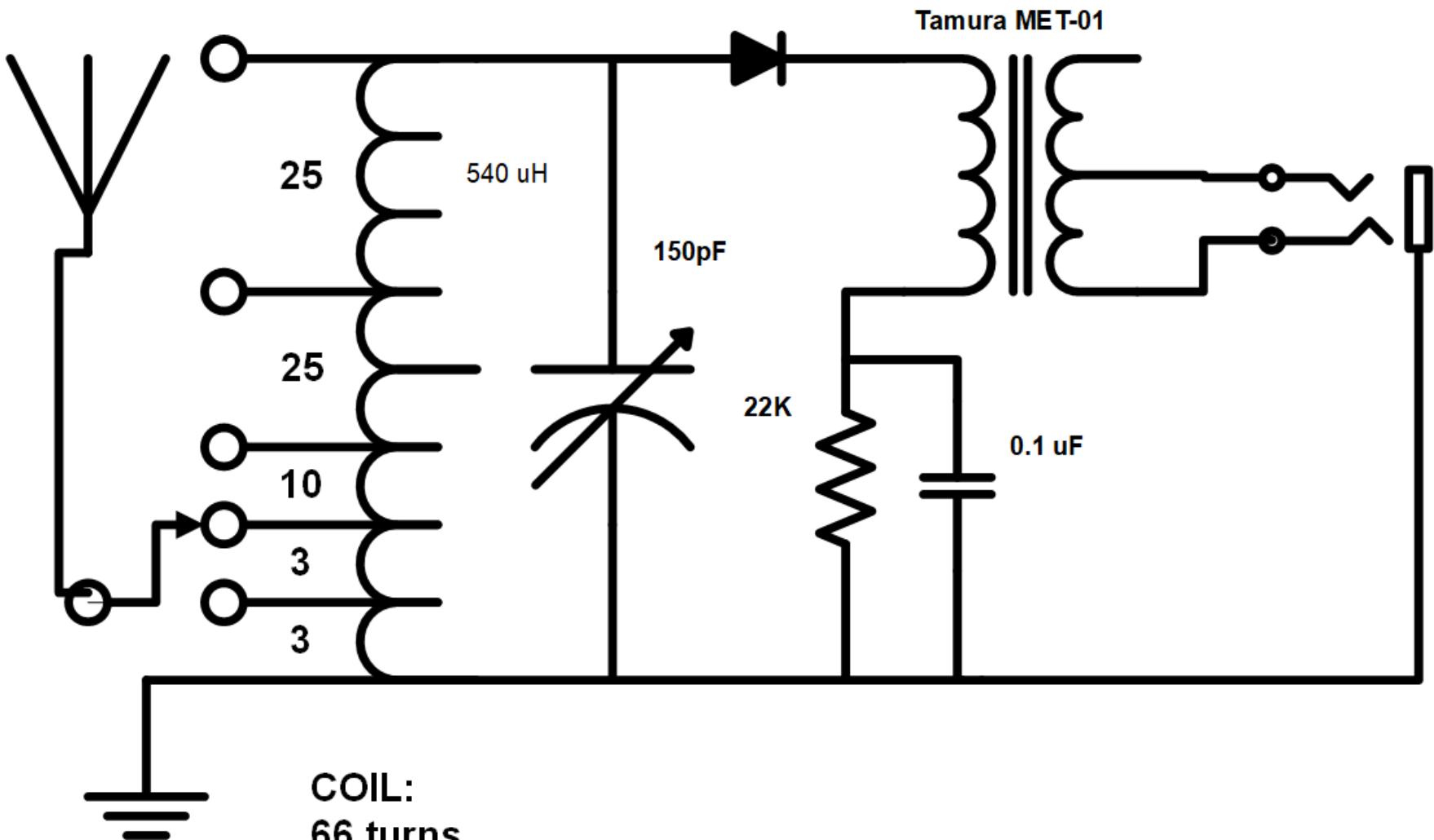


Pocket Mouse Features

- A simple single-tuned circuit
- Housed in 4 x 2 x 1 inch project box.
- Based on the proven [City Mouse](#) design.
- Uses variable cap and knob as found in many transistor radios.
- Wide-range tap switching to accommodate any antenna.
- Matching transformer to support lo-Z earbuds.
 - Even some of the cheap ones are as sensitive as sound-powered phones.
 - I attribute this to rare-earth magnet technology.







COIL:
66 turns
#26 enameled wire
FT-82-61 torroid
Tapped at 3, 6, 16,
41, and 66 turns.

SkyWaves Pocket Mouse Crystal Radio

Al Klase - N3FRQ – 22 AUG 2021

Performance

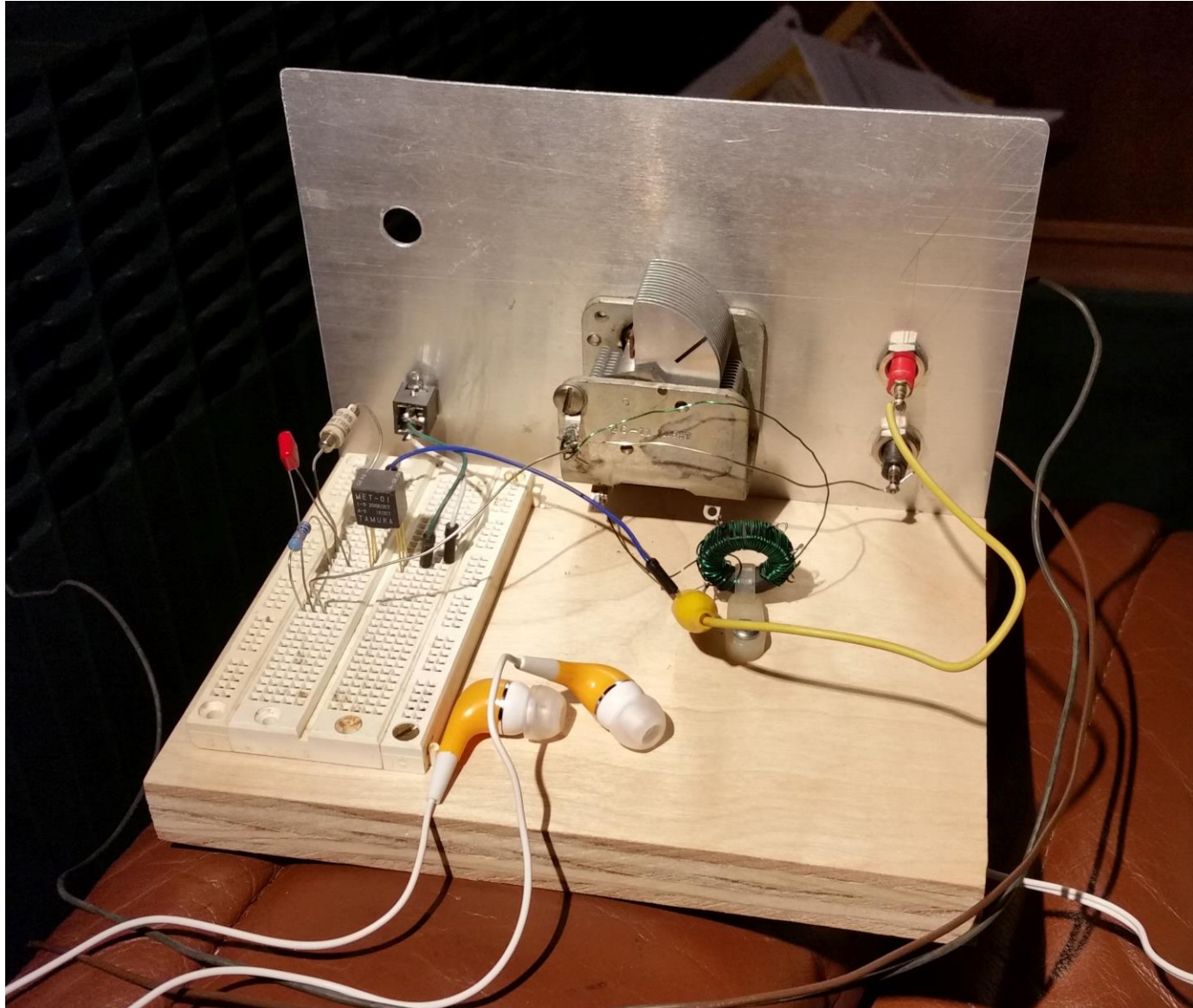
- MDS – 1 MHz, Modulated 1 KHz 30%
 - Earbuds: -40 dBm
 - Sound Powered: -45 dBm

The Rocket-Radio Mode



- Strong Signals Only
- Turn the input coupling all the way to the top.
- Connect the antenna terminal to ground.
- The headset cord and your body serve as the antenna.

You might want to breadboard stuff like this before drilling and blasting.



Skywaves Crystal Set Page

Skywaves Homepage