



Hamvention – 2010

Drake Forum – Slide Presentation

Part Three of Three



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9 a.m. - 5 p.m. (Mountain) Monday - Friday

VISA, Mastercard, & American Express Welcome

Catalogues	SE-3 MK III	Drake R4-C	Receiver Test Data
Cooling Kits	Filters	Other Products	Shipping

How To Tips, White Papers, & Presentations:

Receiver Performance	Radios Used in a Contest Environment
Alignment Tips - added 11/16/05	Dynamic Range Data Table

Featuring:



R-4C Improvements - Drake still belongs in your shack

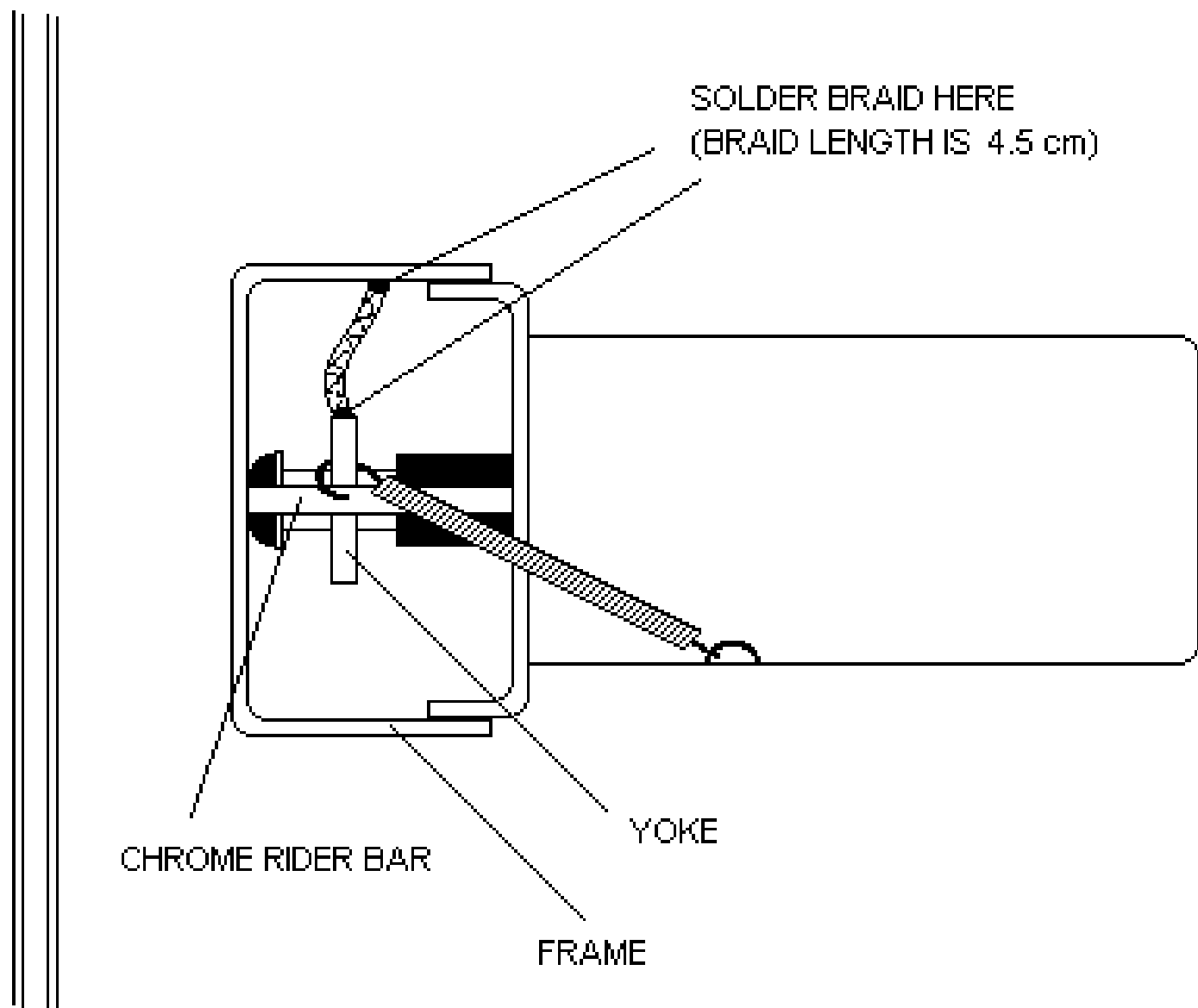
Rob Sherwood
NCØB

From PTOs, meter shunts, to Add-on kits.



Two improvements to the PTO

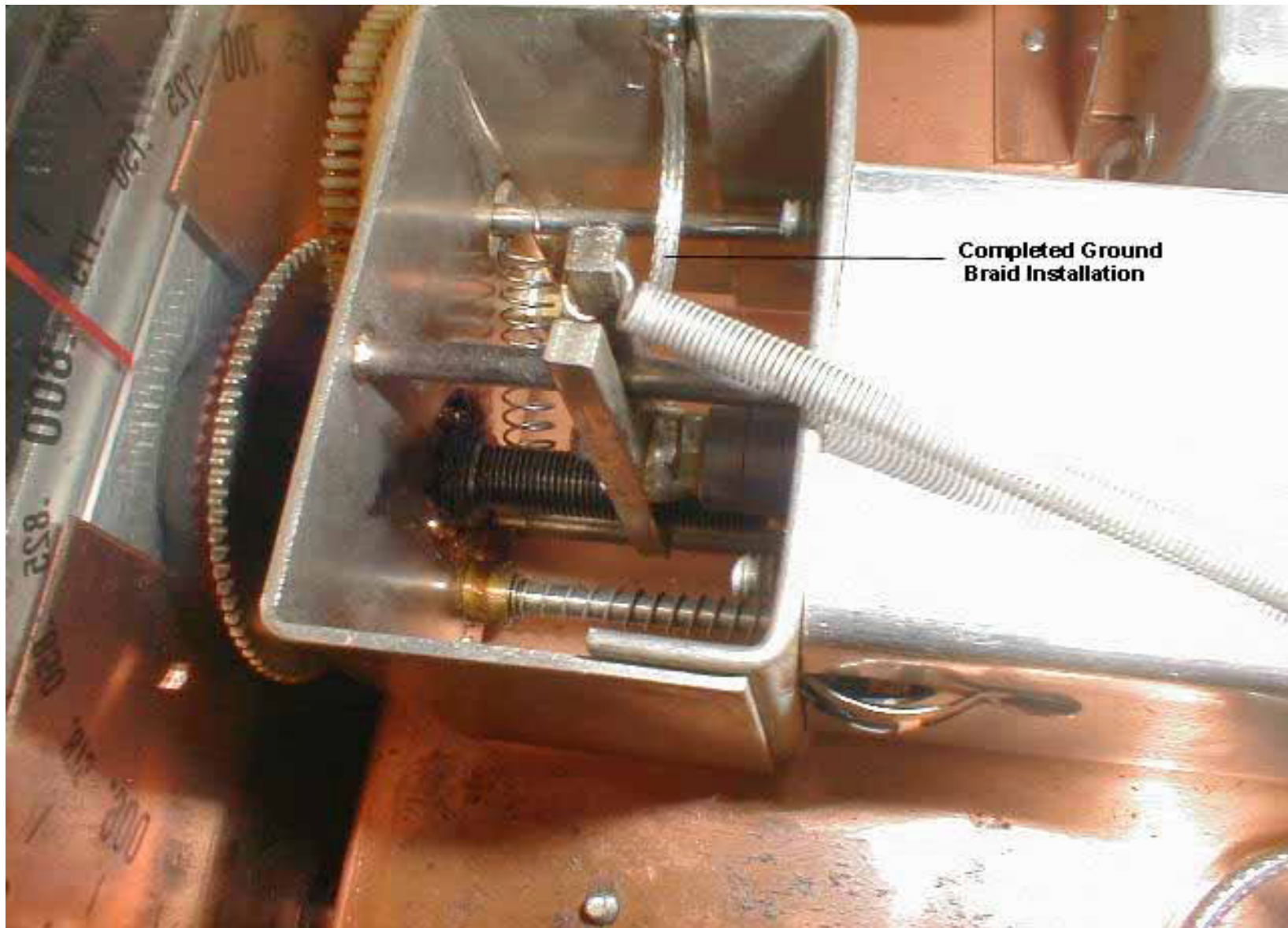
- Purchased a new Drake R-4 in 1965.
- Within a year the PTO started jumping in frequency.
- Adding a ground to the slug carriage stopped the jumping, so I took it to Drake and showed them my “fix”.
- They were not impressed, but replaced my PTO.
- Decades later the TR-7 PTO suddenly had a ground braid added between the carriage and the housing.
- PDF paper by Don Garrett, WA9TGT, with pictures on how to install this improvement at www.W4ISH.net



Picture from Don Garrett WA9TGT



One more view of PTO Ground



PTO Line Related Sidebands

For decades I have noticed that some of the C-lines that came through my shop have had “ripple” on the CW beatnote.

This isn't “hum” (60 Hz or 120 Hz), but sidebands or “modulation” from the power transformer on the PTO local oscillator.

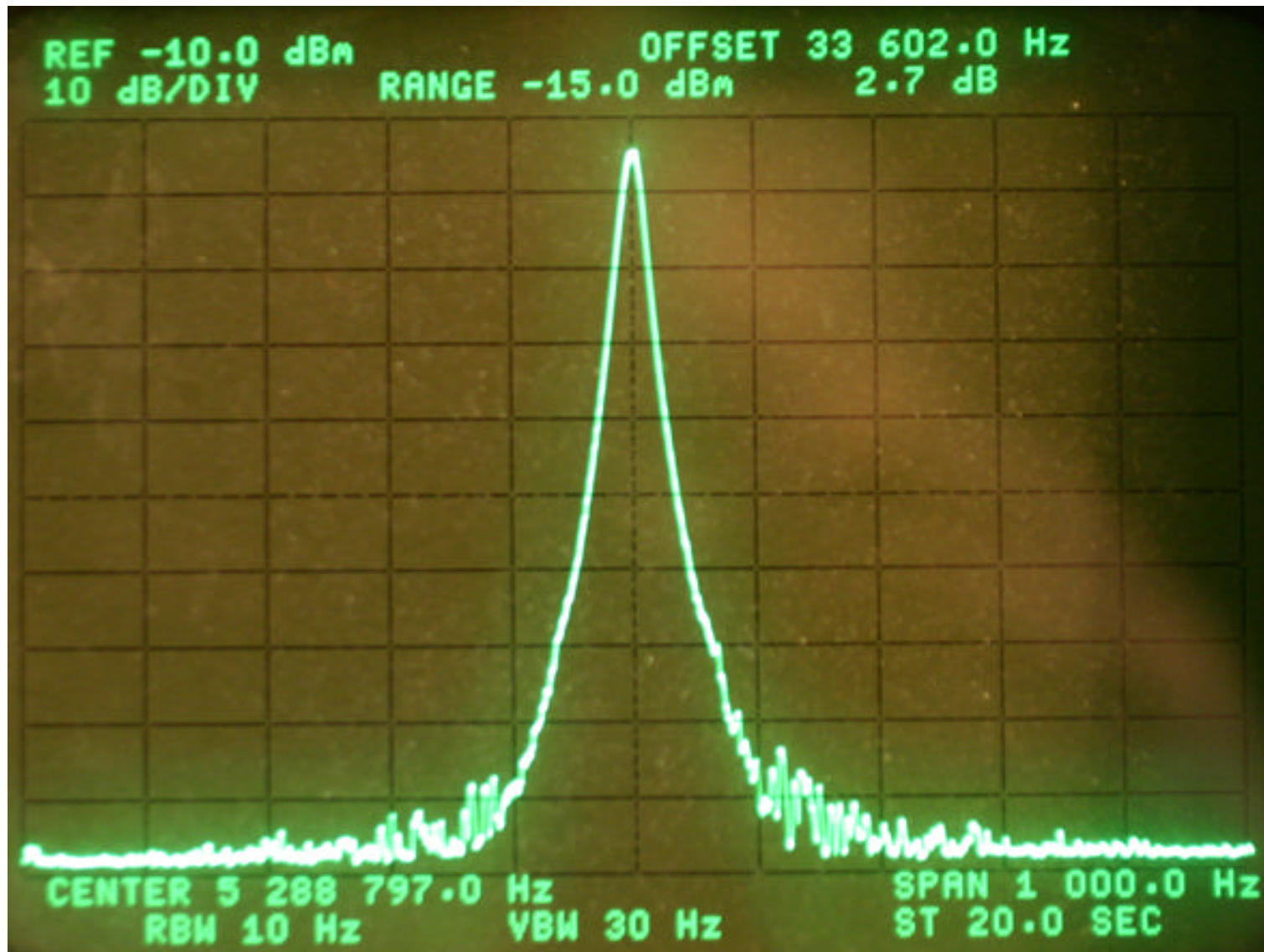
WB0SND's was so bad he said, “fix it or throw the radio in the trash”.

After much time wasted, including replacing the power transformer, it came down to another bad ground.

The ground on the aluminum can around the PTO needed to be improved with a more solid connection than the spring clips.

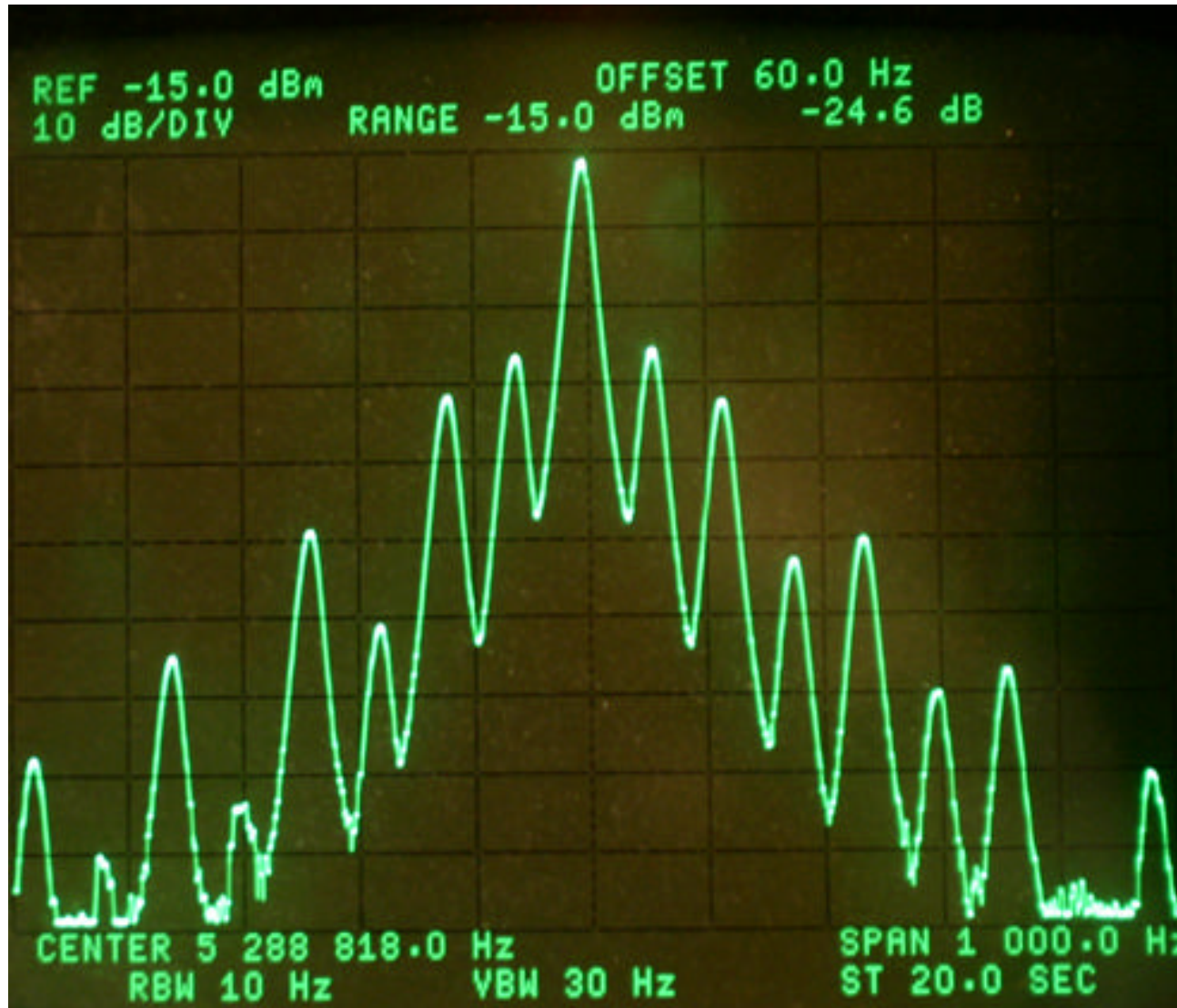
No problems here. Nice and clean.

PTO Removed from radio on bench



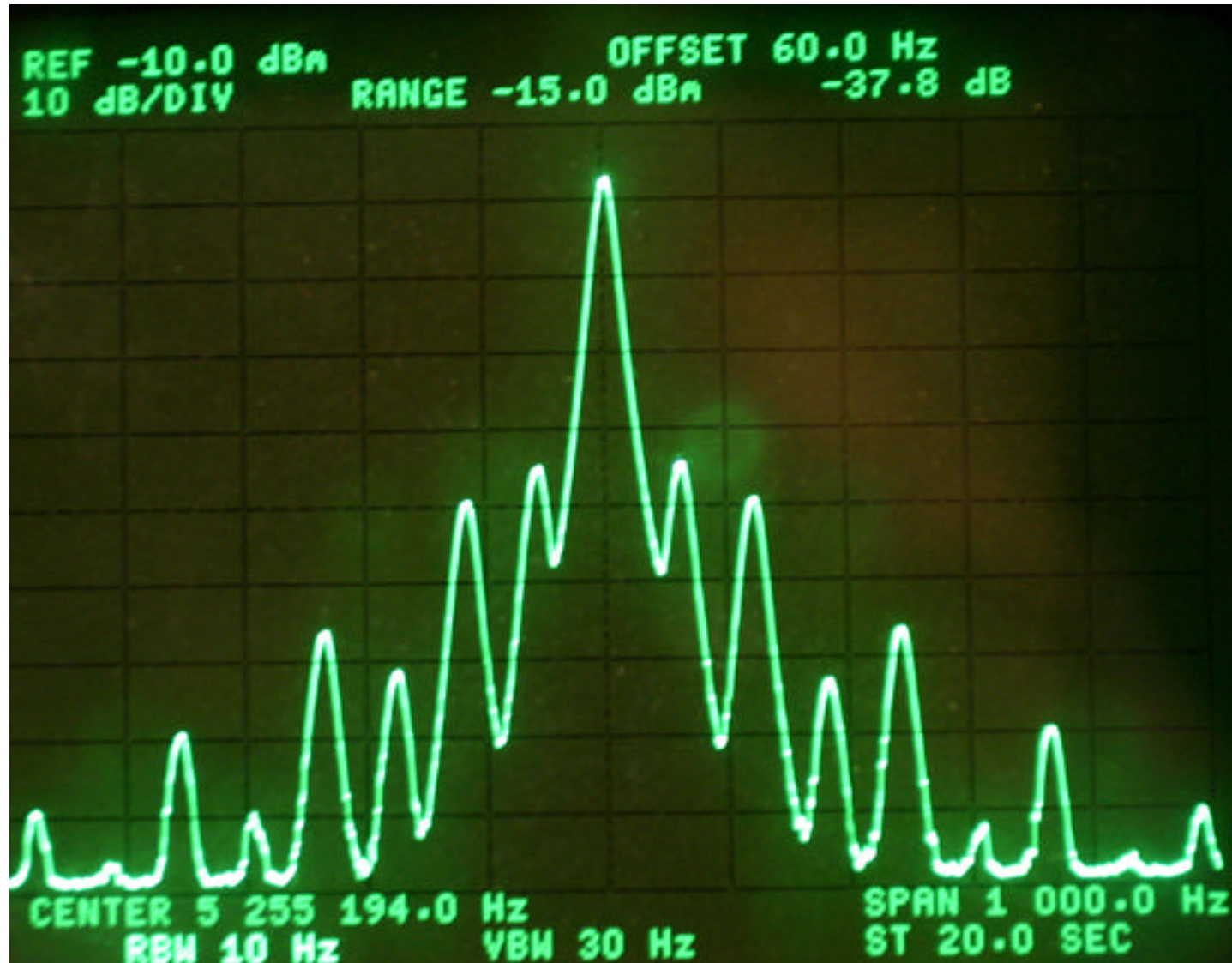
60 Hz down only 24 dB

Line-related sidebands on PTO output.



60 Hz sidebands now down 37 dB

PTO sidebands after adding ground lug



Ground connection to the PTO



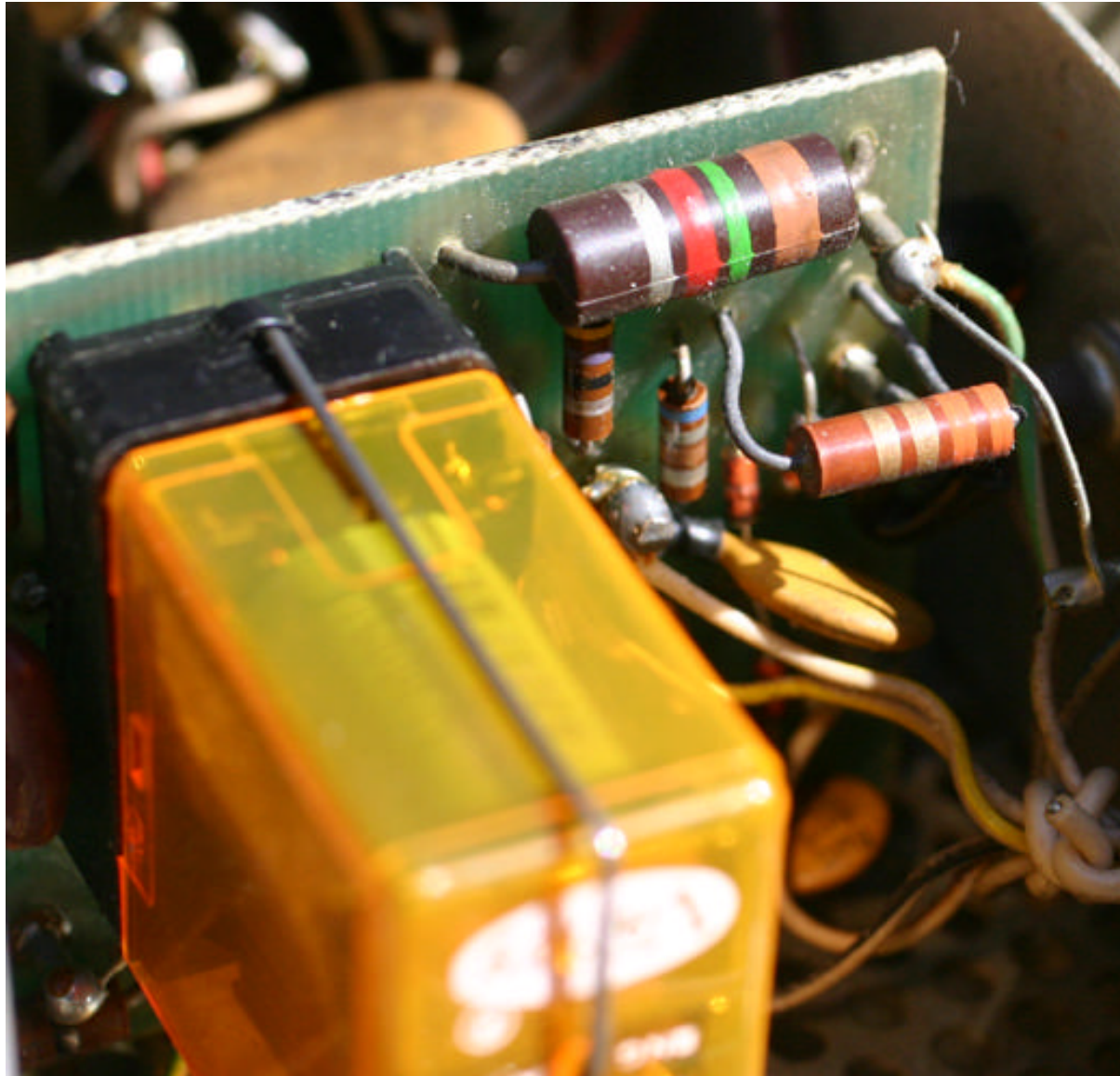
T-4XC Only Puts out 5 Watts !

Minimal output, but the plate meter can go to the pin in tune.

This “wheel spinner” repair ended up to be new to me, but may be common: **The Meter Shunt.**

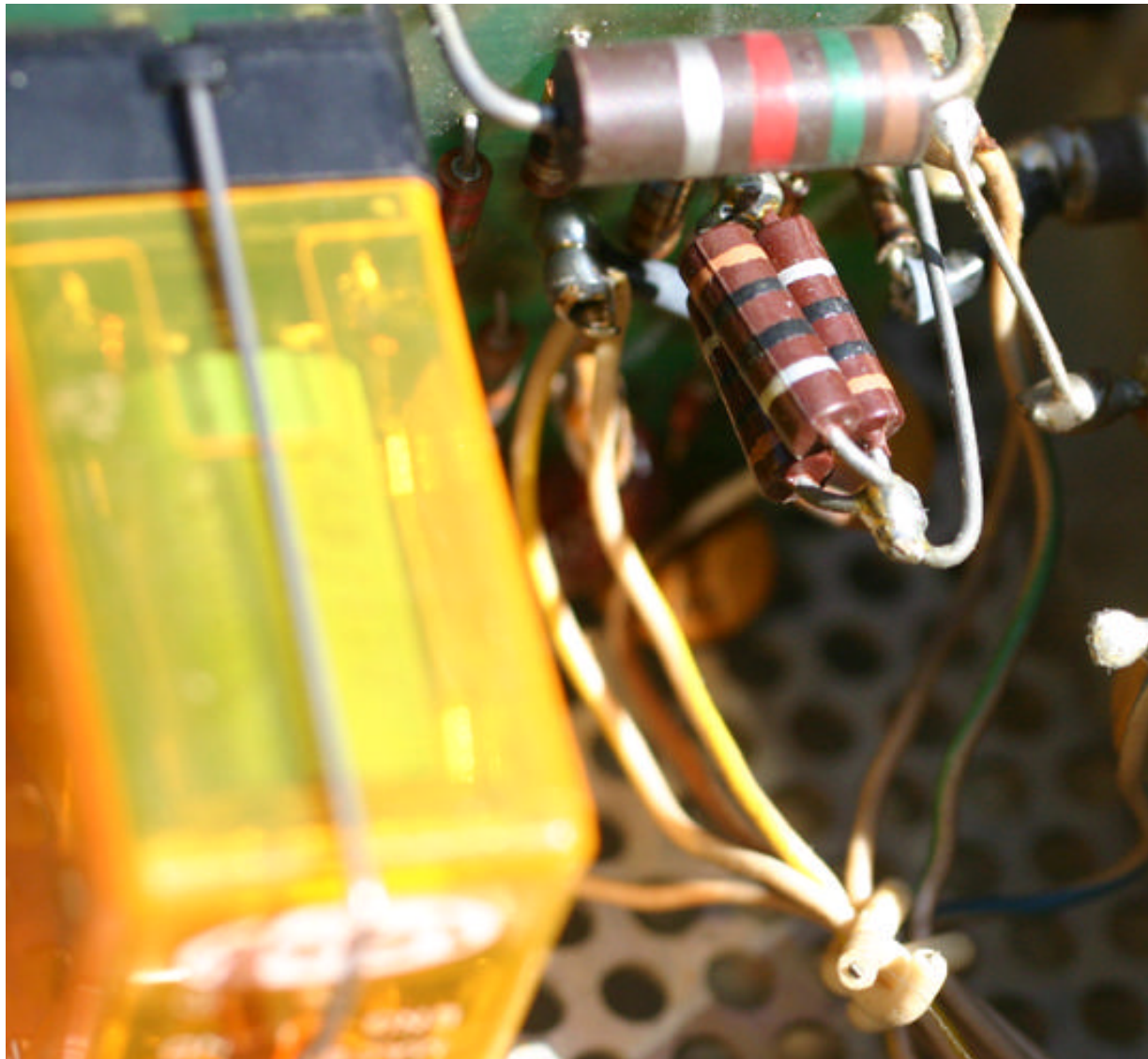
This meter shunt resistor had the side blown out of it. Open circuit.

Example of repaired meter shunt.



Blown and then repaired with $\frac{1}{2}$ watt 3.3 ohm resistor.

Example #2: Three 10 ohms in parallel



Suggestion on a better repair

- I ran into three blown or repaired meter shunts in one month.
- Stock resistor $\frac{1}{2}$ watt, and dissipates $\frac{1}{2}$ watt at full key down.
- Suggest a carbon film or metal film resistor rated at 1 watt minimum.

Receivers in the real world

- Sometimes what we observe on the air cannot be extrapolated from published data.
- What do we really hear, or what can we copy when comparing vastly different radios?
- At times this will surprise you.

Classic testing doesn't always work

- In the SWL world, they call it “recovered audio”.
- They use an active splitter and feed several radios and compare copy of weak signals in noise.
- When band noise is moving the S meter, this is **NOT** a classic sensitivity test.
- It comes down to what you can hear in noise.

Cannot measure everything in the lab

- KL7QOW listening to NC0B, 75 meter SSB
3/14/2010 - 6:15 PM Alaska daylight time
- Band noise about S4 to S5
- R-4C K3 IC-765 IC-761 FT-1000MP
- Q3 Q3 Q0 Q0 Q0
- Not a classic sensitivity issue
- Recovered audio is the difference
- Don't know how to measure this in the lab

What was heard before and after?

15 minutes earlier there was no copy on any receiver.

15 minutes later there was good copy on all receivers.

Yet during that critical period, when signals were just coming out of the noise and were Q3 copy on the R-4C and the K3, the other radios had zero copy !

E-mail from Dan, HB9CIP – Orion II & R-4C

Hello Rob. Since 2 Months now I'm using both ORION II and R4-C.

I modified my ORION II SUB RX so I can switch in the R4C, or use the internal one. I can hear both ORION and R4C in different earphones as main and SUB RX.

I have tested in different situations, mainly on 80/160m. With R4C I can hear sometimes better signals (on 160m - JA's quite often better on R4C) when band is noisy. ORION II has a very good Main RX but using R4C as SUB RX was really a trick!

Thanks for your great help Rob! Dan, HB9CIP

Some updates for the R-4C

We have pre-built electrical kits for the R-4C.

Also **Roofing Filters for CW and SSB.**

Improve the following:

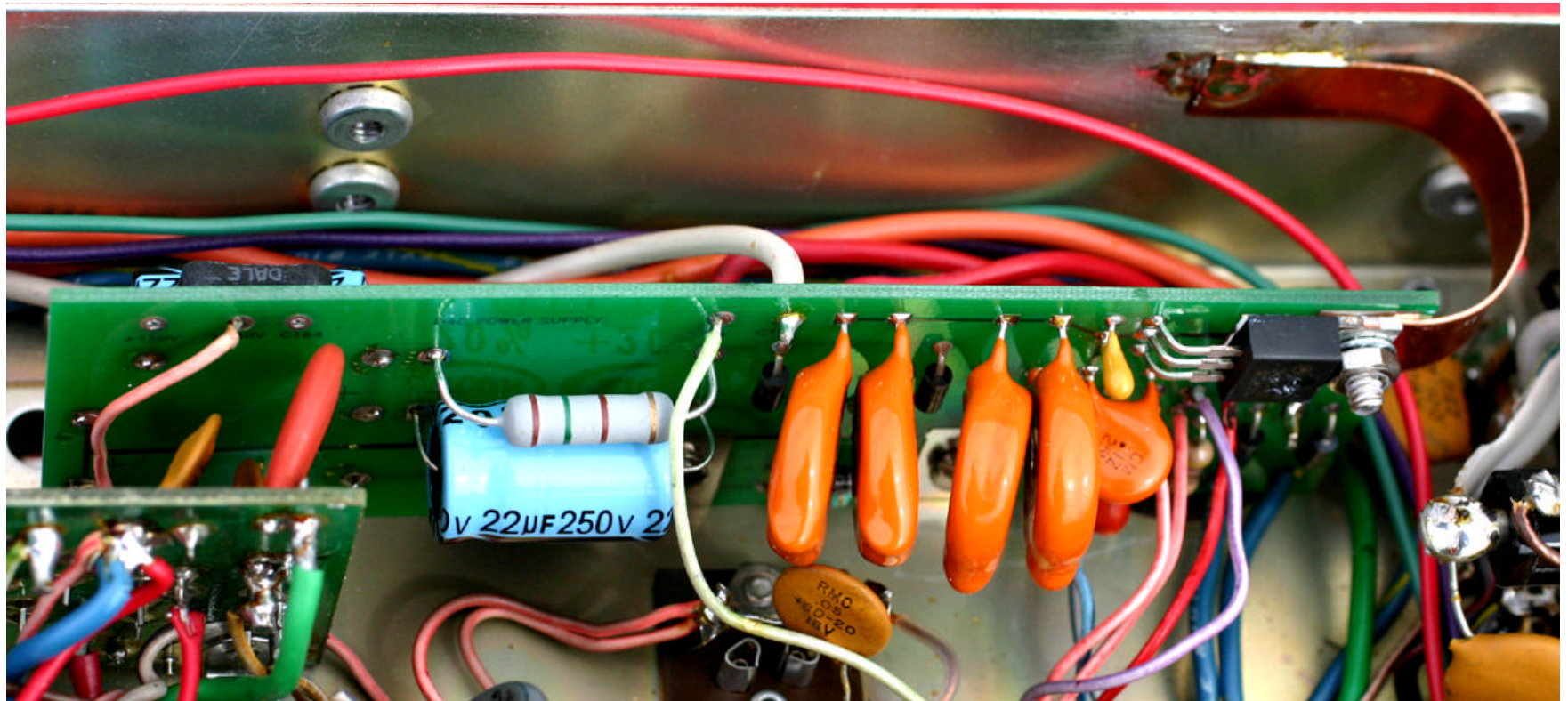
Power Supply

Third Mixer

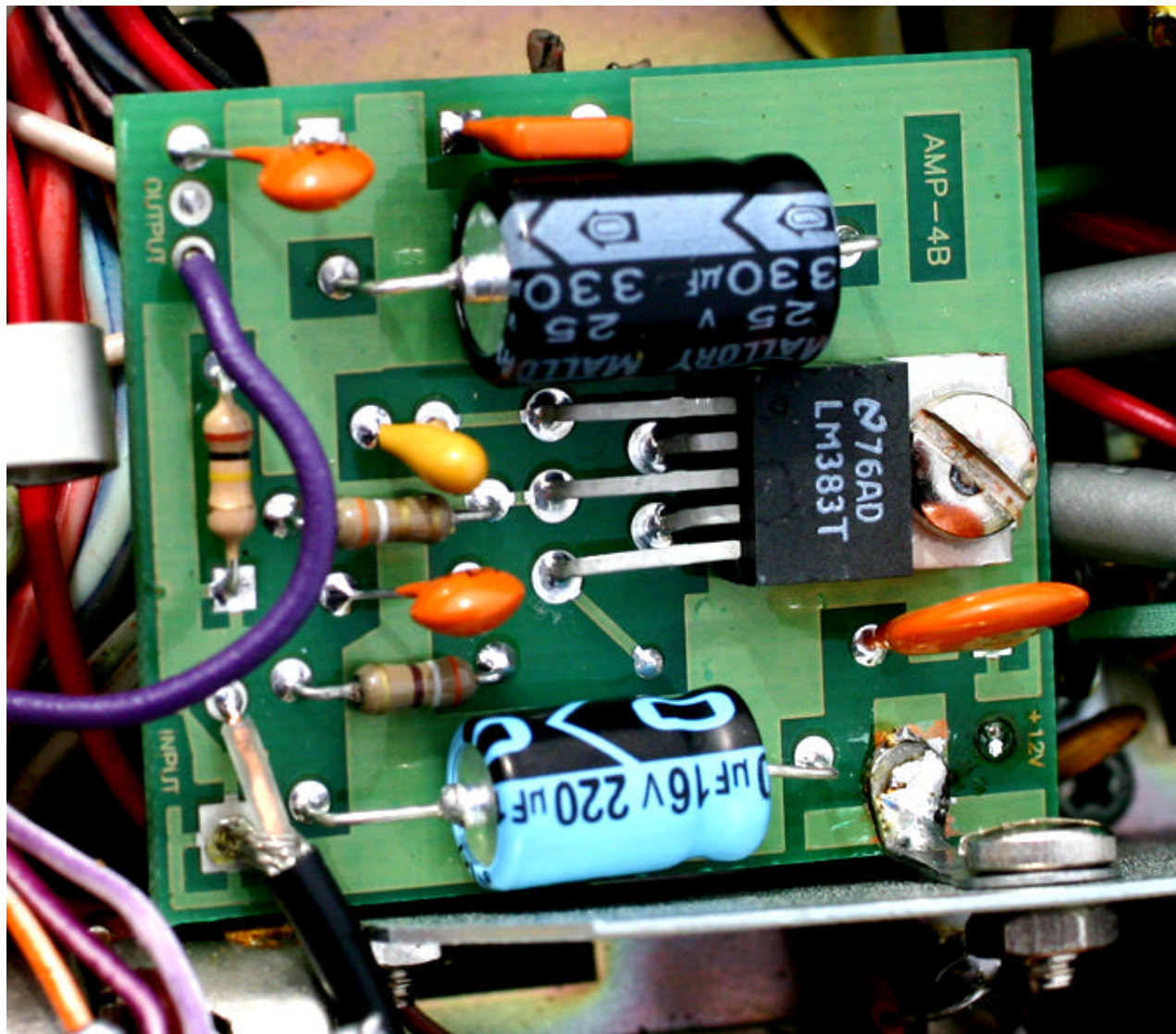
Audio Amplifier

Product Detector

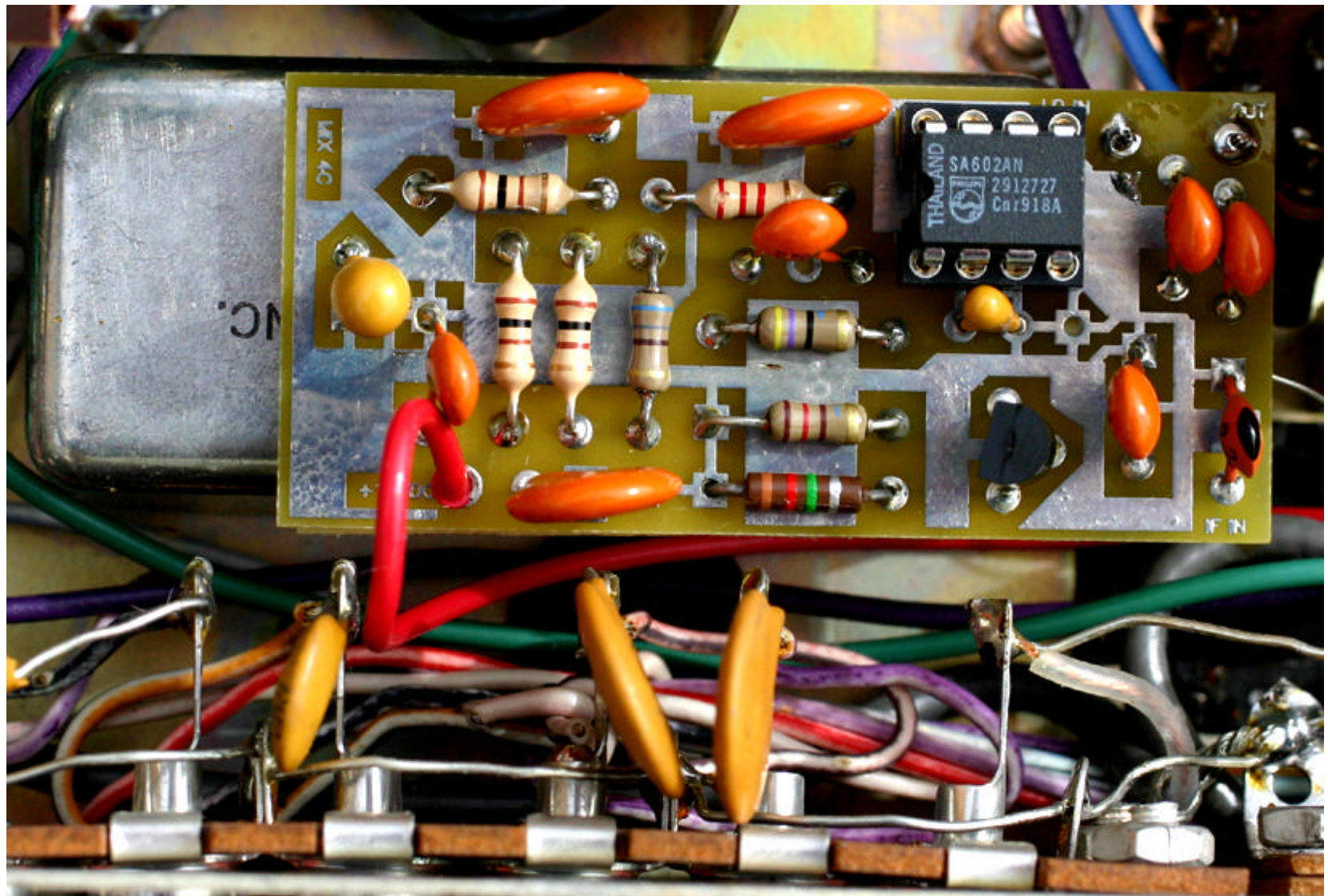
Here is our Power Supply board



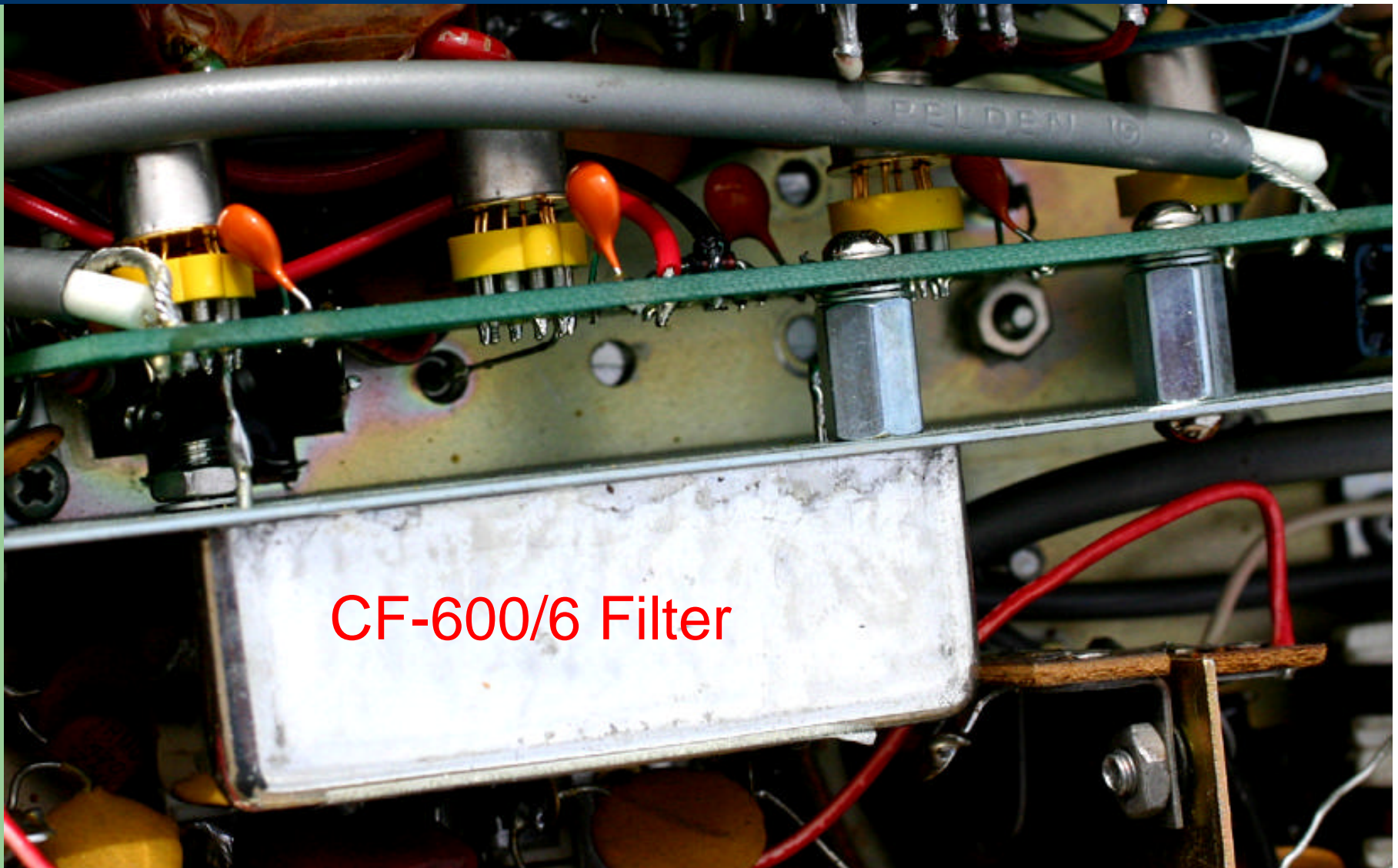
Replace that poor audio amplifier



Solid-State Third Mixer

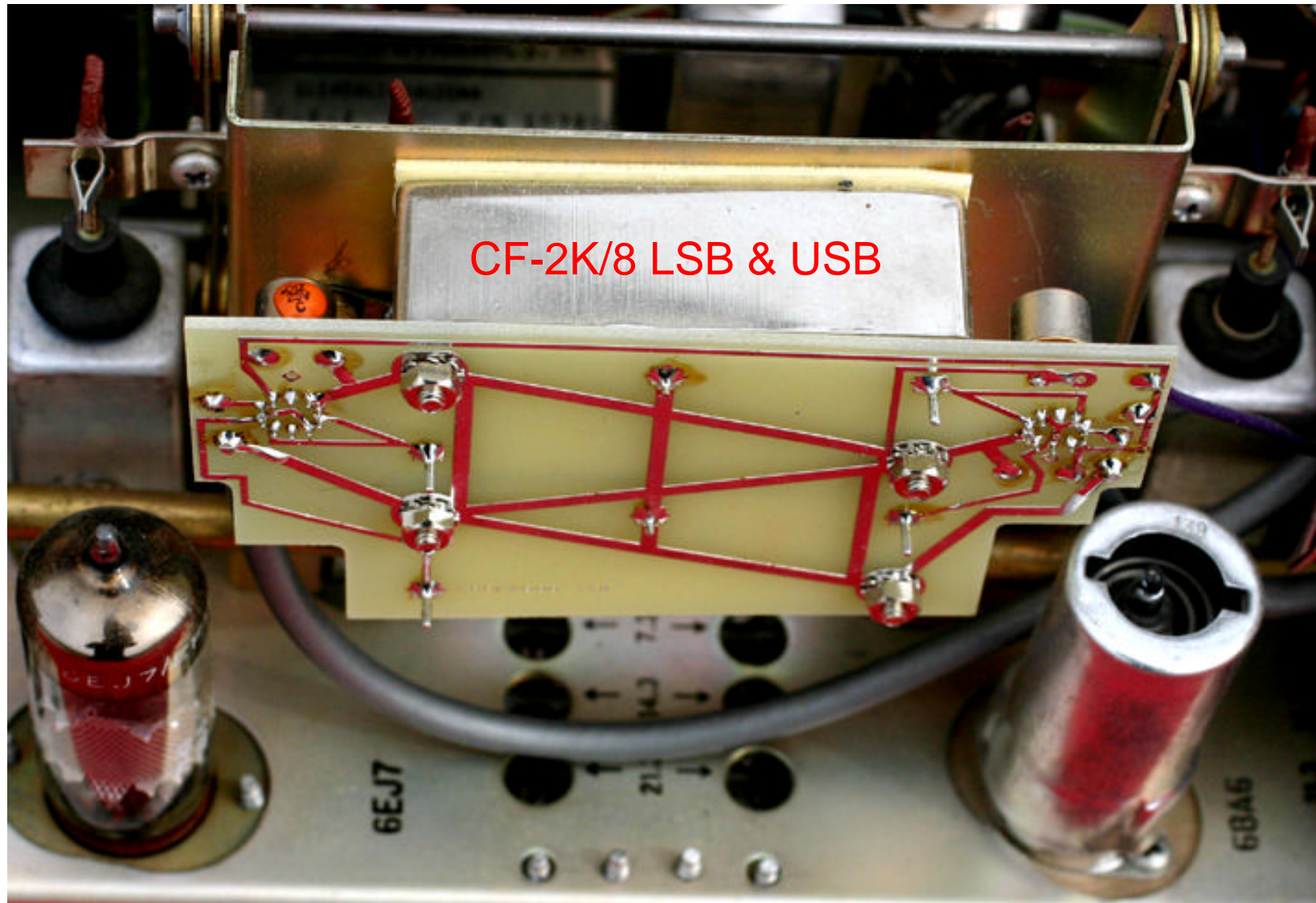


CW Roofing filter and relay switching

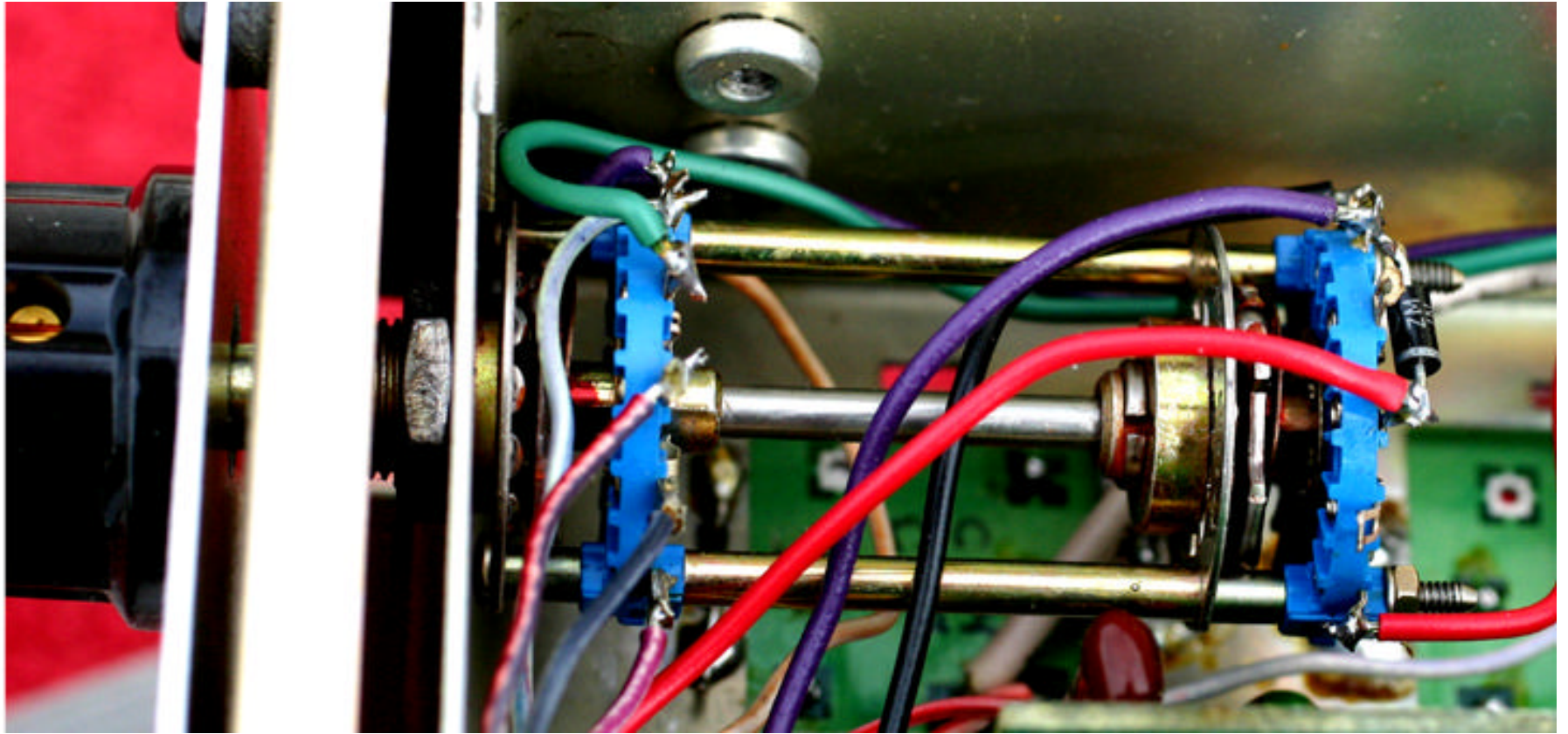


CF-600/6 Filter

SSB Roofing Filters & relay switching



Custom Roofing Filter Switch & AGC



Conclusions

- Even in this day and age of DSP and very expensive radios, new isn't always better.
- You likely own a Drake and a modern transceiver.
- They can compliment each other as HB9CIP observed with better copy on his R-4C.
- You have more than one arrow in your quiver !



Sherwood Engineering

<http://www.sherwood-engineering.com>

<http://www.NC0B.com>



PRIZE DRAWING

No more than 1 prize per person.

Sue, our 'lady of luck' will draw the raffle numbers.



Questions & Answers

Ask the Experts:

Evan, K9SQQ

Jeff, WA8SAJ

Gary, W8PU

Mark, WB0IQK



The Path Ahead...