

R-390A Carrier Meter Mods And Replacing Worn Gain Controls

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The R-390A carrier meter is one of its few weak points: (1) it is very difficult to zero, (2) it tends not to hold zero for more than short periods of time, and (3) its linearity is seldom better than 20 dB over its entire range. Replacing the 100 ohm R523 CARRIER METER ADJ pot with a 100 ohm 10 turn 2 watt wire wound pot solves problem 1, and improves but does not completely solve problem 2. Carrier meter linearity is determined by R548 (27 ohms nominal). The first version of this mod used a single fixed 62 ohm resistor in place of R548. But it was a mistake to use a fixed resistor in place of R548 due to (1) differences in tube characteristics, and (2) differences among RF deck stage gains. At present I am using a small 100 ohm 25 turn 1/2 watt pot mounted on a small thin (1/32 inch) PC board which in turn is mounted to the carrier meter ZERO ADJ and IF GAIN ADJ bracket; see the photo below. Alignment is tricky; the ZERO ADJ is used to adjust the sensitivity (say, at the 80 or 100 dB point) while the 100 ohm 1/2 watt 25 turn pot is used to adjust the meter zero. A calibrated signal generator is needed for this adjustment. Alignment will not be possible unless the ZERO ADJ pot R523 has been replaced by a 100 ohm 10 turn 2 watt wire wound pot.

I used to use only Clarostat 73JA, 2 watt, 10 turn potentiometers and I bought them mainly from Mouser, and occasionally found them at hamfests. Mouser doesn't list them any more. My latest Allied catalog indicates that Honeywell bought out Clarostat. Fortunately it appears that Honeywell is continuing to manufacture the complete Clarostat line.

The 73JA, 2 watt, 10 turn, 100 ohm pot Allied catalog number is: 753-0221. The price is \$19.06 each; see: <http://www.alliedelec.com/Search/SearchResults.asp?SearchQuery=753-0221&Submit=find+it%21>

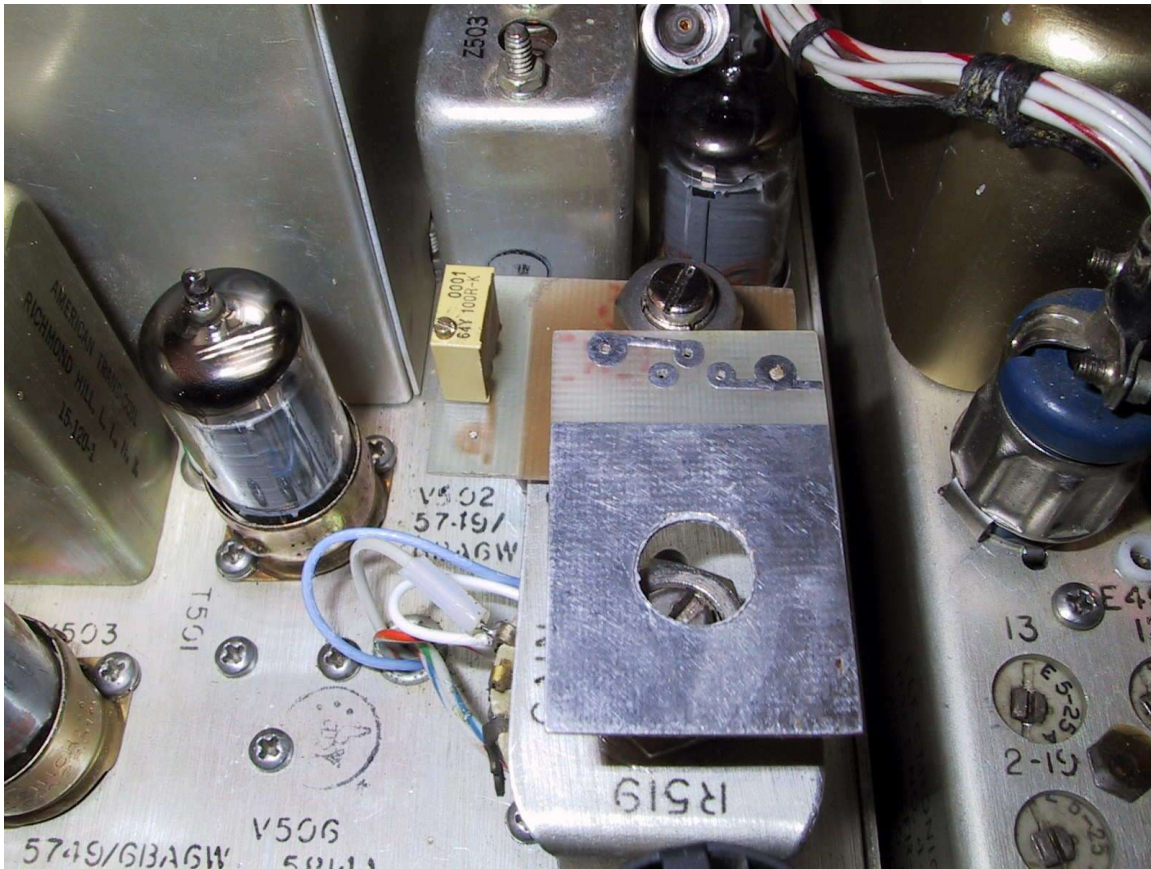
Recently I bought a Bourns 3540 series before I discovered that Clarostat is now Honeywell and is available at Allied. Specifically I used Mouser # 652-3540S-1-101 at \$13.38 each. I had it on hand for maybe 6 months or a year before I used it. It has been in operation for a few weeks and seems fine. However, I would recommend the Clarostat 73JA because I have had some of them in use for years and they have proven long term reliability. The Bourns 3540 is as yet unproven.

For any of these pots you may have to take a little metal off the lip of the mounting hole of the R-390A pot bracket in order to insert the pot. I insert from the right hand side of the IF deck when viewed from the front. I use a round file, maybe 1/4 inch diameter, and file gently at a 45 degree angle slanted high to low from left to right. The idea is to take off just enough metal from the upper left lip and lower right lip when viewed from the front so the the pot bushing will clear. The slight filings in the lips are hidden under the mounting nut and bushing when the pot is mounted.

The LOCAL GAIN and LINE GAIN pots are linear taper, NOT log taper as one might suppose due to their being audio gain pots. I recently bought an R-390A in which someone had replaced these pots with log taper pots. People who don't know what they are doing have no business meddling with R-390A's.

One thing I always do when I replace the ZERO ADJ pot with a 10 turn is to restore the locking feature of the 1 turn pot with a pot shaft lock assembly for the 10 turn pot. This goes back almost 25 years. The reason I use them, rightly or wrongly, is because they may enhance the stability of the zero. The first shaft lock assemblies I used were Millen's, beautifully finished, with the Millen logo stamped into the assembly. Later I used Miller's. I don't know what I have been using more recently... maybe "no name" hamfest shaft lock assemblies, or maybe H. H. Smith's (apparently now Abbatron per the Allied catalog). Allied has the H. H. Smith Type 181 for 1/4 inch shafts for \$8.87 each, Allied # 920-1810. I'll probably buy some of these when I order from Allied again because I have only one shaft lock assembly in my inventory.

Sometimes I grind down nuts if I need them thinner to make everything fit. I do this using a disc sander attachment on my hand drill. Even if I am careful I may grind down my fingers as well.



While you are at it, you should replace the LOCAL GAIN, LINE GAIN, and RF GAIN pots. All of these pots are almost always considerably worn. Even though the solder work is difficult, it is appropriate to replace them. Squirting the old pots with DEOXIT or similar is merely a waste of time; that will not restore worn pots. In my opinion the only sensible replacements for the original R-390A pots are Allen Bradley Type J's. Of course, AB has been out of business for a long time. Fortunately, Clarostat bought out AB and continued to manufacture the Type J's. For the past 10 years or so I have been buying Type J pots at Newark. This may change due to the Honeywell buyout. Fortunately, the Allied catalog indicates that Honeywell will continue to

manufacture the Type J's. The heading in the Allied catalog calls them Mil JA1N Carbon Potentiometers and goes on to say they are Type J hot-molded carbon potentiometers. You will need two of the 2500 ohm and one of the 5000 ohm pots: two 753-2205 and one 753-2206, \$18.11 each. I noticed that one value, 50K ohms, is listed at \$53 each. That may indicate that Honewell will raise prices.