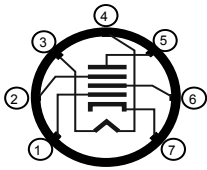


HOLLOW STATE NEWSLETTER

"For lovers of vacuum tube radios"



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EDITOR'S AND PUBLISHER'S CORNER

Since the last issue, I have been able to do a significant upgrade on the computer package used to put this publication out. I am now using a Micron P200 Plus w/64Mb RAM, 4 Gig hard drive, and modem with Microsoft's OfficePro97 package. This is a far cry from the old 386-25!

Part 2 of the Product Detector mod was drawn up using Word97's drawing tools - it is awkward and clumsy, but it can get the job done. I would like to find a reasonably cheap graphic package to do schematics that will easily import into Word - any suggestions would be appreciated!! The URM-25D terminal board graphics were scanned in, touched up with a bit-map editor and imported into the document. *(continued on pg 8)*

CAPT. LEE'S PRODUCT DETECTOR FOR THE R-390/ R-390A - REVISITED

by Paolo Viappiani

The introductory material and background text on this modification as well some suggestions regarding additional AGC and noise limiter modifications were printed in HSN #40 in which issue the conversion details for only the R-390A were printed. In HSN #41 we are including the conversion details for the R-390. Those of you who are contemplating performing this modification for the R-390 should obtain a copy of HSN #40 in order to have the full benefit of understanding this mod

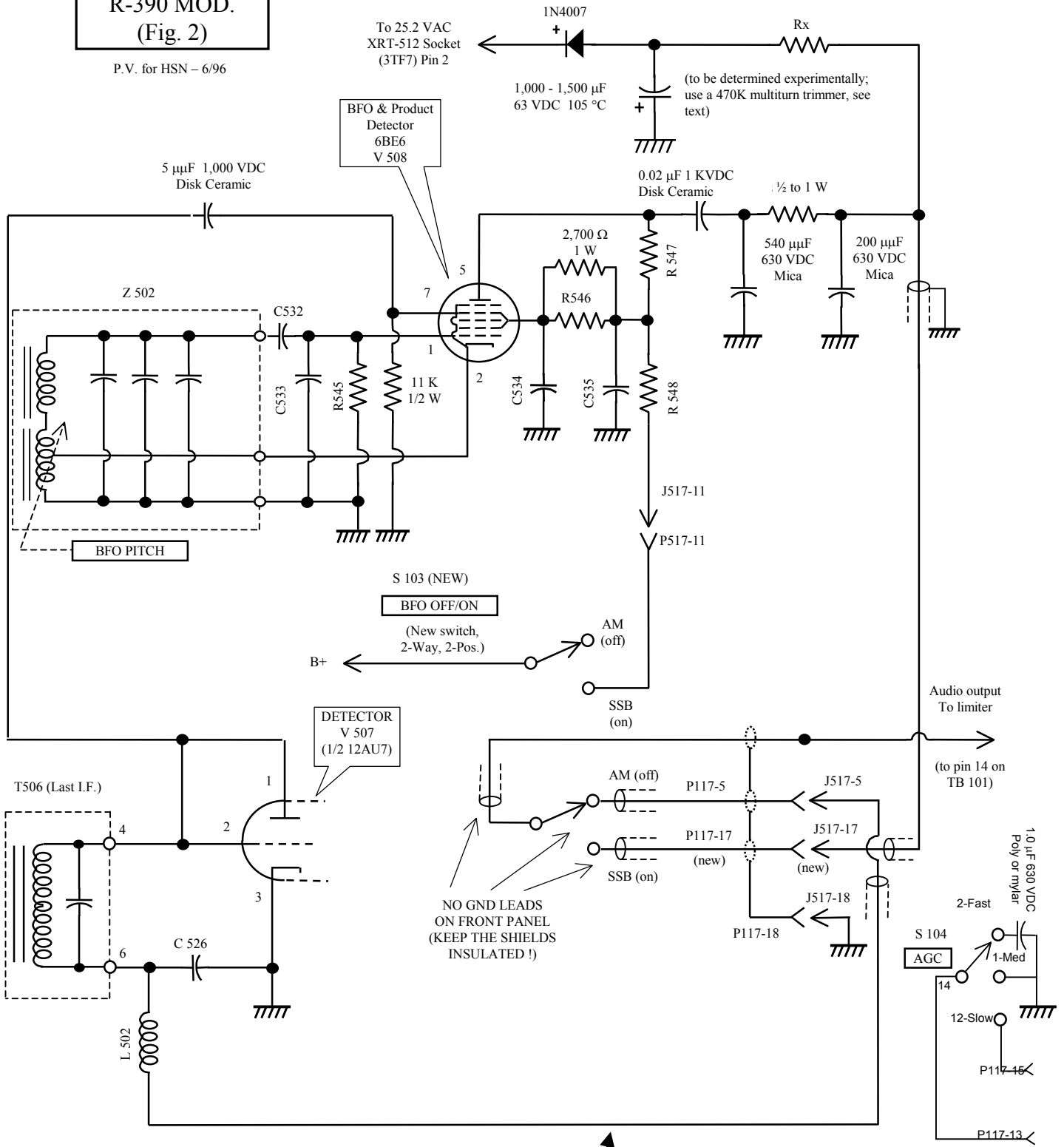
The conversion has to be performed as follows:

R-390 (Fig. 2)

1. Disconnect the two control shafts from the I.F. subchassis, unplug all plugs from it and remove the subchassis from the receiver.
2. Carefully remove the cable clamp and cover from the multi-conductor plug P117 slipping it back along the cable. Remove the wire from pin P117-5 and leave it hanging.
3. Remove the BFO B+ wires from the BFO OFF/ON switch S103. Remove and discard S103, but save the knob.
4. Cut three 20" lengths of single-conductor shielded audio cable (or RG-174 cable); from one end of each piece strip back 1" of outer plastic jacket AND SHIELD BRAID and use insulating sleeves for protection.
5. Take the new switch, a 2 pole/2 position unit for S103, and connect the inner conductor of the three shielded leads to it to form the audio changeover circuit as shown in Fig. 2.
6. Mount the new switch in the vacant hole on the front panel and replace the knob. Connect the BFO B+ wires to the other pole of the switch (the BFO B+ is to be ON in the BFO "ON" position, which will become the "CW/SSB" position of the new S103).
7. Twist the 3 shielded wires from S103 into a cable and wrap with plastic tape at 3" intervals; cut to the required length to reach plug P117 leaving sufficient slack for clearance over the I.F. subchassis and tubes and run the 3 wires through the cable clamp and plug cover.
8. From the free end of each of these 3 wires remove the outer plastic jacket and carefully unravel about 1" of the shield braid, forming a 1" pigtail lead. Twist the 3 pigtails together and solder them, being careful not to melt the plastic insulation on the inner conductors. Slip an insulating sleeve over the common shield lead and over the joint.
9. Make a spare pin in P117 rerouting the grounding leads from pin P117-17 to pin P117-18 (which is also grounded). Connect the inner conductor of the shielded wire from the CW/SSB (BFO ON) audio terminal of S103 to pin P117-17; use an insulating sleeve for protection (as is done for the other wires on the plug).
10. Connect the inner conductor of the shielded wire from the AM (BFO OFF) audio terminal of S103 to pin P117-5. Use an insulating sleeve as in step 9 above.
11. Slip an insulating sleeve over the free end of the remaining wire, which should be the one connected to the rotary arm of the audio section of the new S103; this is the "audio input" lead. Solder it to the free end of the wire left hanging in step 2 and slip the insulating sleeve down over the bare connection.
12. Carefully solder the "pigtails" lead to pin P117-18 (the ground terminal in P117); this one must be the only connection to ground of all the three added audio cables. Pay close attention in order to avoid undesired contacts in P117 (eventually use tape or insulating sleeves as required); carefully replace the cover and cable clamp on P117. Tape the three new wires to the existing cable just outside the clamp.
13. Turning the I.F. subchassis over, carefully remove the bellows coupling on the BFO PITCH control shaft; remove the shaft by loosening the panel bearing (in order to clear some working space around the XV508 socket). Remove V508, 6BA6 (BFO tube) and add it to your junk box.

R-390 MOD.
(Fig. 2)

P.V. for HSN - 6/96



CAUTION!
Make a spare pin both in P117 and in J517 rerouting the gnd. leads from P117-17 and J517-17 to pins P117-18 and J517-18 which are also grounded.

AGC SWITCH MOD

14. Remove the ground (and all wires) from pin 2 of XV508. This may involve shifting several ground leads to other ground tie-points on the subchassis.
15. Move the existing lead from XV508 pin 7 to pin 2 (this is the cathode tap on the BFO coil Z502) and in the following steps be sure to leave enough room for replacing the bellows shaft coupling.
16. Connect the 11K 1/2 W resistor from XV508 pin 7 to ground.
17. Remove and discard C536.
18. Connect the 2.7K 1 W resistor in parallel with the existing screen dropping resistor R546.
19. Connect a 5 μ F SILVER MICA or DISK CERAMIC capacitor between XV508 pin 7 and XV507 pin 1. This is the I.F. coupling into the injection grid of the 6BE6 Product Detector.
20. With a pair of small metal shears cut 1/4" V-shaped notches in the edges of the interstage partitions behind the BFO coil. Cover them with short pieces of plastic tape.
21. Mount the 200 μ F and the 510 μ F SILVER MICA capacitors on the grounded center post of the XV507 socket, letting them be supported in space by their own ground leads (about 1/4" long).
22. Connect a 56,000-ohm, 1/2 to 1 W resistor between the free ends of the 200 and 500 μ F capacitors.
23. Connect a 0.02 μ F /1,000 V DISK CERAMIC capacitor from XV508 pin 5 to the 510 end μ F of the 56,000-ohm resistor.
24. Locate XRT512 (the 3TF7 current regulator socket in the corner of the subchassis below the BFO tuning shaft) and solder the cathode end of a 1N4007 diode to XRT512 pin 2; let the diode be supported in space by its cathode lead or install an insulated standoff on the side of the I.F. subchassis for a more adequate support (this requires drilling a hole in the subchassis).
25. Connect a 1,000-1,500 μ F, 50 to 63 VDC/105° quality electrolytic capacitor from chassis ground (positive terminal) to the anode lead of the 1N4007 diode. Find or install a proper ground lug for the positive (grounded) terminal of the capacitor. Be sure the negative lead of the capacitor remains properly insulated from the chassis ground.
26. Add a small insulated standoff to one of the XRT512 or XV508 screws (if there are not enough screw threads to mount the insulated standoff securely, you will have to replace the screw with a longer one) and connect its lug to the junction between the 1N4007 diode (anode lead) and the electrolytic capacitor (negative lead). You can use a small piece of insulated wire for the purpose.
27. Place a small 470K, 25-turn trimmer on the outer side of the I.F. subchassis (you can use a drop of glue for fixing it temporarily in place) and route two insulated wires connecting the trimmer center lead to the 200 μ F end of the 56,000-ohm resistor (see step 22) and one of the outer trimmer leads to the junction between the 1N4007 diode (anode lead) and the electrolytic capacitor (negative lead).
28. Use a convenient length of RG-174 cable for the CW/SSB audio lead. Remove 1" of the plastic jacket from one end, and make a 1" braid pigtail on this end. Slip a 7/8" insulating sleeve over the pigtail and ground the pigtail to the center ground post of the XV507 socket or to a ground lug in the vicinity. Connect the center conductor to the 200 μ F end of the 56,000-ohm resistor.
29. Lay the RG-174 in the V-shaped slots in the interstage partitions and tape it in position with plastic tape. Cut the wire to length to reach pin J517-17 of the rear cable socket (the pin that mates with pin P117-17 of the cable plug). Reroute the existing grounding lead from pin J517-17 to pin J517-18 (which is also grounded). Strip back 1/2" of the plastic jacket and braid from this end of the shielded wire; connect the center conductor to pin J517-17, using an insulating sleeve for protection.
30. Carefully replace the BFO shaft and bellows coupling removed in step 13; make sure the coupling doesn't accidentally ground any component or wiring.
31. Replace the IF subchassis in the receiver (leaving some space in the bottom for the crossing of the two trimmer leads); insert all the plugs removed and temporarily reconnect the 2 control shafts and their front panel knobs (make sure they are properly positioned).
32. Plug in a 6BE6 tube in the XV508 socket; turn on the receiver and switch the new S103 to the CW/SSB position (BFO "ON"). With the antenna disconnected and the BANDWIDTH switch in the 1 Kc position, set

- the BFO PITCH control for the lowest pitch of the hiss. Then, without rotating the shaft, loosen the knob set screw and set the knob pointer to "0".
33. Connect the antenna and enjoy both AM and CW/SSB reception. Switch the Limiter on and with various settings of the LIMITER control carefully adjust the 470 K trimmer for the most satisfactory operation (caution: this adjustment requires several trials and a long time listening).
 34. After having adjusted the trimmer properly, disconnect its leads (this requires the I.F. subchassis removal) and measure the resistance with an Ohmmeter. Remove the two wires crossing the bottom of the subchassis and connect directly the standoff near XRT512 or XV508 and the 200 μF end of the 56,000 Ohm resistor with a fixed resistor of the nearest value to the measured one (1/2 to 1 W rating).
 35. Replace the I.F. subchassis and enjoy your R-390!

QUESTIONS AND ANSWERS FROM OUR READERS

This section will present questions from subscribers for which responses are solicited. If you can help in providing answers, suggestions or just plain good advice - please send them to the editor for inclusion in the next issue of HSN.

??? I have a problem with my R-390A and hope one of the subscribers has an answer ... On the 16-32 Mhz range (and only this range) signal levels rise with the Megacycle Change knob out of the detent. I realigned the range and it is now satisfactory on some of the Megacycle bands, but it is still 'out' on others. I thought realignment would fix everything Or maybe I missed something. All the other bands below 16 Mhz behave as specified.

Ans. *[I inadvertently forgot to include a portion of Allan Mui's HSN #40 response to questions posed in HSN #39. Here is the omitted part - sorry Allan - rcw]* Regarding the usefulness of AGC circuitry in the Collins and other HF receivers, it is not very useful most of the time. The May 1994 issue of QST contains an article by Dr U. Rhode, KA2WEU on receiver design ("Key Components of Modern Design - Part 1") which is very critical of AGC circuit designs. As an example of when AGC might be helpful to use, I recall once listening to Radio Norway Int'l on a Radio Shack "communications" receiver with severe fading of the signal. I believe that adjustment of AGC to "slow" may have helped reception during strong fades.

SHORT SUBJECTS

R-390A MANUAL SOURCE UPDATE In HSN #35 pg.7, another manual source for the R-390A is mentioned, that being the Naval Publication Center with a 1985, 2-part set. Well, they do exist, but each of the parts are \$100.00 ... and based on the comments of someone who is a good friend of the author of the HSN #35 article and who 'lucked in' to a free set, save your money. The set is basically the same as the 0967-063-22-10 NAVSHIPS April 1970 manual that can be acquired for a lot less than \$200. The format is slightly different but the contents offer no significant new information. They are a combination of the operations, parts and maintenance manuals; they are not the same as the -50 depot repair manual [editor].

TUBE TESTER ROLL CHARTS [Ron Reeland] In reference to the "Classic Tube Testers" article in HSN #39, damaged roll charts can be carefully mended with transparent tape as indicated in Alan's article. However, often the paper is very weakened by the aging process and additional tearing will probably occur. A phone call or visit to a local copying service may reveal that they have photocopiers that use large, continuous rolls of paper. They have the capability to copy the old tube roll charts onto stronger new paper, probably of higher quality than the original. Charts that are very yellowed with age may produce a somewhat "muddy" photocopy, but can be

minimized with careful setting of the exposure control on the copying unit. Also, you may have to trim the edges to fit the rollers on the tube tester, but I think you will be pleased with the results.

R-390 RF TUNING COIL SILVER TARNISH [John Gillespie] I recently cured a serious problem in an R-390 and felt it might be a good idea to share it with the membership.

A few years back we took possession of an R-390 at basically a giveaway price. We found out why when we initially powered it up. The radio could basically only receive local AM and little else, but it was filled with enormous snaps, crackles and pops.

We made several attempts to revive the set with no success. We checked all the tubes, tried some tube substitutions, measures tube socket voltages, but it all revealed nothing. Using a scope we could see that the noise was coming from the plate of the 1st mixer. But it did not really explain why the RF signals were absent. From here it looked like the problem must be buried in the mixer circuitry under the RF sub-chassis. But when the RF deck was out and on the bench, the components of the 1st mixer looked and tested great. This was when we discovered what just might be the problem. The RF coils are removable, and the banana plugs for each coil were black with silver tarnish, and the 6 mixer coils were the worst.

Over the years I have seen a lot of silver tarnish in military sets but was unaware that this tarnish can negatively affect the functioning of these sets. I really was not sure that cleaning these contacts would help the set, but I was grasping at straws with this crackling problem. So, over the next 8 hours I removed all 30 tuning coil cans one at a time. Cleaned the mini-banana plugs and their respective hole contacts and also cleaned the underside of each variable capacitor as they were heavily tarnished also.

When the set was reassembled we were shocked to find that most of the annoying crackling was gone and in its place was good solid RF signals. This entire set had been shelved for years because of silver tarnish. I honestly would not have believed it. After reassembly we performed a complete alignment and how the set performs almost like new.

To clean the banana plugs we used a silver tarnish remover paste called "Twinkle" available through any grocery store. After cleaning we were careful to remove all traces of the tarnish remover and followed up with a generous spray of a commercial contact cleaner. We found the best way to apply the Twinkle was with a chamois VCR head-cleaning wand.

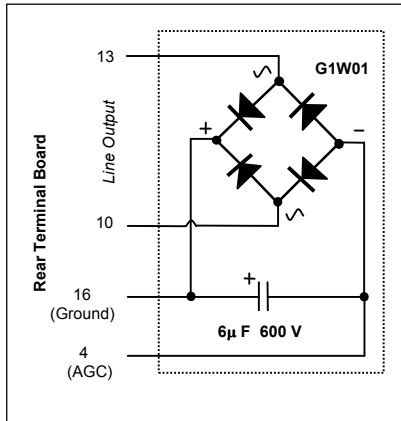
To clean the under side of the variable capacitors we lightly spread the contact point open to ensure the tarnish remover would clean the contact point and not just the exposed surfaces. A Q-tip worked wonders under here. Again, we removed all traces of Twinkle and then 'lightly' sprayed a little contact spray to ensure a good contact when the joint was pushed back together again.

It isn't necessary to remove the RF deck to perform this cleaning. Use a pair of needle nose pliers to remove the 2 springs holding the slug bridge down. Remove the slug bridge. Then using a #1 Phillips screwdriver, loosen the screws holding each tuning can to the RF deck. Note these are captive screws – they will not fall out. They make servicing a breeze. Next we fabricated a small 'J' hook to aid us in pulling each can up and out of the RF deck. Remove the 2 - #6 nuts that hold the outer can to the coil form. The coils are fairly robust and will withstand this level of service without damage.

Again, I am amazed that silver tarnish can drastically affect these radios. I always figured the tarnish was only on the surfaces exposed to air and that the contact points would be clean and bright. This set demonstrates to me that the tarnish can be a factor in poor performance.

"SSB ADAPTER" – REVISITED [Reinhard Wieschhoff-van Rijn, Rambouillet, France] In recent issues of ER you can find what is called an "R-390/A SSB Adapter" in the classified ads. My curiosity was great enough to order and buy one. After that I found that 12 years ago Dallas, in HSN #10, wrote a short evaluation of his experience ending with "... recommend against purchase of this SSB adapter." From his description, this appeared to be identical to the one I bought.

So I decided to take it apart – what Dallas did not do at the time – by boiling it in water to dissolve the potting material to find out more about it. Here are the results:



When you connect the device as is recommended in the one-page leaflet that comes with it, the line audio voltage is bridge-rectified by an ordinary silicon power supply bridge rectifier (General Instruments, type GI W01), the output DC voltage being filtered by a 6 µF electrolytic capacitor. That's all!

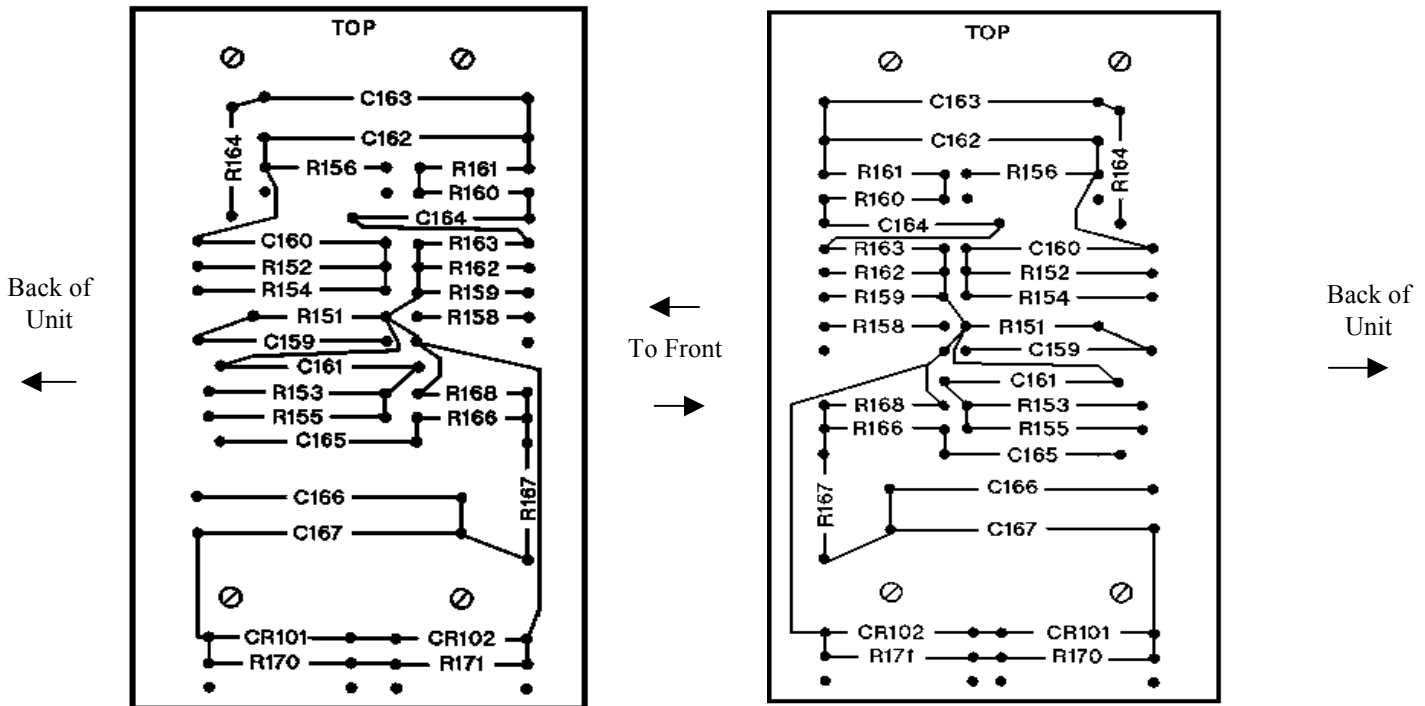
The voltage is applied to the AGC line of the receiver. Being of low source impedance, the AGC voltage overrides the receiver's. The resulting AGC performance is very much dependent on the adjusted LINE GAIN. The line output voltage will be distorted unless you put the LINE GAIN to zero. AGC attack time constant will be 3 to 4 msec, release time constant is much too long under the condition of a healthy rectifier with high reverse resistance. The

relationship of AGC voltage versus antenna input signal will be questionable and different from the original one. One final remark – the parts count and cross-checking with the Newark catalog reveals that you might be able to duplicate this circuit at less than 10% of the sale price. Nothing has changed from Dallas' earlier conclusions.

SUPPLEMENT TO 'REBUILD NOTES FOR URM-25D SIGNAL GENERATOR' Courtesy of our publisher, we now have to scale, annotated, component and eyelet side layout drawings for the URM-25D Terminal Board to supplement the currently available rebuild notes. These may make at least some of the work a little clearer if not easier. These views are reproduced here.

Eyelet Side

Component Side



BRISTOL SPLINE WRENCHES – SOURCES [Editor] For those of you who are still looking for a current source for the infamous Bristol spline wrenches, an essential tool for working on the R-390 series and many more

of the military and quasi-military receivers, here is another source – Max-Gain Systems, Inc. 221 Greencrest Ct., Marietta GA 30068. They are currently advertising new 9-piece sets (they did not specify the sizes) for \$13.95 + 1\$ shipping/handling US and \$2 worldwide. I saw this referenced on the Boatanchors news reflector – check it out at www.aaow.com/msg or e-mail them at mgs@awana.net. Also you might want to use the regular landline (770) 973-6251. Not an endorsement – you take your chances!

PUBLICATIONS OF INTEREST

SHORTWAVE RECEIVERS PAST & PRESENT – SECOND EDITION One of the most ‘talked about’ new book (at least on the Internet) on radios in recent years is venerable author Fred Osterman’s new edition. There is not too much that this book does not cover as far as receivers go with over 500 shortwave tabletop general coverage, amateur, shortwave and specialty models featured. Receivers from 1945 through 1996 are covered. Allied to Yaesu are covered and most everything in between. Photography is excellent, 8-1/2 by 11 glossy stock (351 pages total) and ALL the information that is pertinent about each particular receiver. Also included are new and used prices and value ratings, as well as the relative rarity of each. Fred has also included some good ideas about buying used receivers, listing of other good books and periodicals, clubs and journals (including HSN), and some known restoration and repair businesses. Fred also welcomes comments, corrections or additions for the preparation of a future Third Edition.

This is a superb book, and for a change, a book that has certain facts correct especially regarding the R-390 series and the Hammarlund SP-600 Super-Pro. With inflated prices for printed material these days, this book is an extraordinary value at \$19.95 plus shipping. Available from Universal Radio, Inc., 6830 Americana Parkway, Reynoldsburg, OH 43068-4113. Telephone 1-800-431-3939.

WANTED TO BUY / SELL / TRADE / WHATEVER

Nothing this issue.

EDITOR’S AND PUBLISHER’S CORNER *(Continued from pg 1)*

It works pretty well. I hope that we will have a new e-mail address for Publisher Ralph in HSN #42. He is having a hard time getting a local (no toll call) provider. You will also note that I finally have e-mail (and full Internet access) as well. Please feel free to send your submittals and tips anytime. Planned future acquisitions include an HP flatbed scanner and fax.

I would also like to express my thanks to both the regular and new contributors who have provided the ‘fuel’ to keep this publication going. I urge all of you, particularly those with a long-time acquaintance with these ‘boatanchors’ who probably still have much to pass on to those who did not grow up with these receivers, to take the time and write up your experiences. It is a knowledge base that is not getting any younger!!

For HSN #42, some of the articles I am expecting to put into print include a reprint from “Fine Tuning” on the SP-600, the results of a recent SP-600 serial number research piece, a modification to the R-390A AC line filter to eliminate ‘popping’ your GFI circuit, an SP-600 model number/generation ‘decoder’ list, and some more observations and ideas from the Internet.

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