

APPROACHES TO THE DEAD RECEIVER

Date: Fri, 24 Sep 1999 11:00:25 -0400
From: "Corbeille, Richard E" <Richard.Corbeille@PHL.Boeing.com>
Subject: [R-390] wiring harness follow-up

Two weeks ago I requested assistance from the list on my dead SW R390A. I want to express my sincere thanks to all that offered advice and encouragement. Surprisingly, every one of the tips contributed to finding the problem. Before I give the solution I think it is interesting to summarize the advice and the eventual finding.

1. check B+. I had 150 volts so figured I was good to go, wrong!
2. green screw on RF too long. yep, had that
3. pinched wires on front panel had evidence of that too
4. debugging procedure, output to input very helpful, saved time
5. encouragement. thanks!
6. utilize test points on RF deck. this produced a signal eventually..

The upper green screw on the RF deck was a little too long and did contact the wire bundle but fortunately caused no damage. Two wires leading to the BFO switch are long and did get pinched between front panel and deck plate. Besides getting flattened, no apparent damage but definitely an area to note when re-attaching the front panel. I had been checking every pin on the upper modules because the receiver was upright and it was convenient. After advice to begin at the output I flipped her over and began at the terminal block for local output. Everything was fine until I got to pin 2 on P119, one of the connectors on the AF deck. It connects to the on-off switch. There was about 23M ohm present.

Closer inspection of the schematic revealed fuse 103 in phantom. It had been added in the circuit. Wow! Checked the fuse and sure enough it was 23M ohm. The fine wire was covered with a white powder. I just couldn't believe that I was such a dummy to be caught with a bad fuse but I was excited anyway. Inserted a new fuse and powered up. This time there were signs of life. The BFO worked, the CAL worked and there was some noise from the speaker but no signal. Not to make excuses, but I guess I was accustomed to only one fuse and if it blew the equipment was dead. So I had lost partial B+. To wrap up this long winded and perhaps sophomoric post, I do get a broadcast station by inserting a test lead in test point E108 on the RF deck. It appears that the problem must now be the antenna relay and, if not that, I must remove the RF deck one more time (ugh) and check the shielded lead from the relay. Correct? Again, sincere thanks for the assistance.

Date: Sun, 02 Apr 2000 15:17:46 -0400
 From: "Charles A. Taylor" <calltaylor@prodigy.net>
 Subject: Re: [R-390] DEAD RADIO!

>I hope I can get some help with this.
 >Turned on my 390 today to find- nothing! Audible static that varies with the
 >line level (good af stages) but no reception and no bfo squeal. Worked super
 >prior to this! Any help on where to start looking?- Roger

After running your R-390 for about five minutes, feel the tubes in the IF section to see if one is cold. When you energize the BFO, and operating the BFO frequency control, can you hear the swish of the BFO oscillator? Does operating the bandwidth control change the pitch of the background noise, if any?

Date: Sun, 2 Apr 2000 13:23:03 -0700 (PDT)
 From: Joe Foley <redmenaced@yahoo.com>
 Subject: Re: [R-390] DEAD RADIO!

Time to invoke the standard rules of troubleshooting.

- 1.) Check the most common problems first, plugs all seated? Fuses good?
- 2.) Get the tube tester out, check the tubes.
- 3.) Do a close visual inspection looking for obvious problems, heat damage, loose or damaged components or parts.
- 4.) Power to all switches, plugs, cords?
- 5.) DON'T FORGET SAFETY!! You've got a problem, it could be anything, it may be that a hot wire has come loose and is resting on the chassis, or the cover that you'll be removing. When you take that cover off it WON'T be grounded but the wire will follow it. How's your ground?

Date: Sun, 2 Apr 2000 17:38:35 -0400 (EDT)
 From: Norman Ryan <nryan@duke.edu>
 Subject: Re: [R-390] DEAD RADIO!

If Charlie's suggestions check out OK, trouble may lie in the RF deck, but first work all connectors and plugs to see if the trouble clears. If no joy, try tapping T-208 (Is your set an R-390A?) or wiggling it. I had a similar failure that was traceable to this part. I took the RF deck out, fiddled around T-208 looking for open circuit, but the trouble disappeared never to be detected, thus problem not definitively resolved. But, heck, the rig has been working fine since. Hope you find the problem. Do you have the depot maintenance manual?

Date: Sun, 2 Apr 2000 17:06:52 -0700
 From: "dave faria" <dave_faria@hotmail.com>
 Subject: Re: [R-390] DEAD RADIO!

Check to see if the 6BA6 in the vfo is lit. If 390a chk the tube on the crystal deck. If 390 chk I think 6AJ5 in crystal deck. Does not sound like loose connections but chk appropriate BNC connections. Does not sound like a serious death resurrection possible.

Date: Mon, 03 Apr 2000 08:06:42 -0700
 From: Dick Carroll <dixie@townsqr.com>
 Subject: Re: [R-390] DEAD RADIO!

I once had a National NCX3 transciever that failed at 18 years age. I traced the trouble to an open IF can. On a hunch, I reheated all four of the connections, melted the solder, adding a little new solder, then tried it. It worked perfectly, and never gave any more trouble. Evidently one of the solder joints went "cold" after all those years. That isn't a unique situation, I'm sure. To me, its nothing short of miraculous that any unrestored R390X still works after all these years, given all the plugs, sockets and contacts that must reliably make for it to happen. It is a testimony of the quality of those plugs sockets and connectors, but time, grime and corrosion will take their toll. The failure could be in any number of places.

Date: Mon, 3 Apr 2000 10:16:56 -0400
 From: km1h@juno.com
 Subject: Re: [R-390] DEAD RADIO!

Open ballast tube on the IF deck? That controls the series wired filament voltage to the VFO and BFO tubes. About 25 Ohms @ 4W in socket pins 2 and 7 should get it up and running. I used a pair of 51 Ohm 2W carbon that were on hand and they fit the socket perfectly. There are more elaborate fixes if you need regulated voltage.

Date: Mon, 3 Apr 2000 11:56:15 -0400 (EDT)
 From: Norman Ryan <nryan@duke.edu>
 Subject: Re: [R-390] DEAD RADIO!

<snip>.....I think I ended up resoldering the connections to T208 instead.

Date: Mon, 3 Apr 2000 12:30:14 -0500
 From: "Jon & Valerie Oldenburg" <jonandvalerieoldenburg@worldnet.att.net>
 Subject: Re: [R-390] DEAD RADIO!

I had the same thing happen on the R-390a last year when the 3TF7 went open. Ironically my Collins R-390/URR has developed the same symptoms on saturday night. I have checked all tubes in the RF & IF decks, all are ok(all @ 80% or beter spec). Replaced V-401 in the oscilator (whick tested shorted) but still no audio.

Date: Mon, 03 Apr 2000 14:03:34 -0400
 From: "Charles A. Taylor" <calltaylor@prodigy.net>
 Subject: Re: [R-390] DEAD RADIO!

The ballast tube will glow visibly at turn-on, but may not glow while the set is in normal operation....perhaps only a very dull red glow.

Date: Mon, 03 Apr 2000 14:00:07 -0400
 From: "Charles A. Taylor" <calltaylor@prodigy.net>
 Subject: Re: [R-390] DEAD RADIO!

The ballast tube regulates CURRENT through the series string of the BFO and PTO heaters!

From: "Chuck Rippel" <R390A@R390A.com>
 Date: Wed, 9 Jan 2002 12:52:32 -0400
 Subject: [R-390] Dead R390A

Check and see if the ballast tube is getting warm, V505 on the IF deck and the PTO tube filaments are lighting up. If not, the ballast tube is open and it is time to replace it with solid state like I did Les' radio. If not, take a scope an start by checking the outputs of the various oscillators. They should all beat at least 2V p-p.

Date: Sat, 21 Dec 2002 13:04:07 -0500 (EST)
 From: "Paul H. Anderson" <pha@pdq.com>
 Subject: Re: [R-390] Dead R-390A

>Well, I am about to begin my R-390A school. I have had my R390A for
 >about 2 years now and it has always worked great. Left it on the other day
 >by mistake. It was on maybe 4 days straight. Well now all I get is a faint

Leaving it on (not standby, but regular ON) is fine - year around, in fact as long as it stays reasonably cool. I think in the military, they were assumed to be left on continuously with tube changes every six months. Folks on this list have carefully rebuilt theirs and left them on for more than a year with no troubles. A few days is no big deal. Helps it dry out anyway!

> hum from the speaker. Man I dread pulling that thing out of its cabinet.
 > Have worked on a lot of Collins 75A types but this is going to really be
 > new. Does this receiver have a time delay relay? It has always been dead for
 over a minute and then I hear a click and it comes to life. Now no click and of
 course, no signal. It seemed as though an antenna relay was pulling in.

There is an antenna relay - it should click immediately when you go from standby to on. It should turn off when you go to calibrate. There should be no delay unless by some chance someone added something to accomplish that, but I have no idea why they would. I'd lean more towards a sticky or underpowered

antenna relay.

> Guess I better go find a manual and see what I can learn. Wish me luck
> and all help welcomed. John

Make sure you get the Y2K R-390A manual - that will be a great place to start. Search the archives in qth.net for Y2K and you should find it rapidly.

Date: Sat, 21 Dec 2002 13:44:32 -0500
From: "Jim M." <jamesmiller20@worldnet.att.net>
Subject: Re: [R-390] Dead R-390A

Check the ballast tube (3TF7 I believe) on the IF module. It regulates the filaments to the BFO and PTO tubes. If it burned out, you would get no signal. Also the little rectifier tubes on the power supply seem to be prone to failure (at least mine are).

From: "John Page" <k4kwm@hotmail.com>
Subject: Re: [R-390] Dead R-390A
Date: Sat, 21 Dec 2002 23:16:49 +0000

Man, do I feel dumb. The dead R-390A was just a fuse. It has 3 fuses and looking from the rear, it was the one on the right. Labeled B+. Must me another source for audio B+ cause I definitely had audio hum from the speaker. Still have the situation where I turn it on and it comes up and I get audio (can hear it hum in speaker). Not AC hum but just, well you know what I mean. Then in about 45 sec I hear a click and instant signals. A least it works now. Just wonder what the delay could be????? Thanks to all who responded with ideas. Glad all it was just a fuse. But it do make you go "duh". John

Date: Fri, 30 Jan 2004 06:43:42 -0500
From: K2CBY@aol.com
Subject: [R-390] New Guy

"I don't plan on firing the radio up until it is recapped."

If I were you, I'd go a little slower. Recapping an R-390A is not a job to be undertaken lightly -- especially in the IF subchassis where there isn't much elbow room. What's more, I've never been convinced that wholesale recapping is strictly necessary. The greatest danger of working on everything at once is the risk of making an error. If the receiver was working to begin with, a mistake during overhaul merely creates a troubleshooting problem. That is difficult enough when you are dealing with a "patient" whose idiosyncrasies you don't know, but that's the easy case. Now suppose there was a pre-existing fault that prevented the receiver from working "out of the box." Add a second error during overhaul, and you've got real trouble. Now you have two troubleshooting problems, and you've got to solve BOTH of them before the receiver utters a peep. That is a real nightmare unless you have "known good" modules on the bench to swap. R-390As are pretty hardy beasts. In more than 20

years of owning one, the only times I have had a completely "dead box" are the result of tube failure, plus one instance of a mechanical filter with one side of the coil shorted to ground (only the 4 kHz bandwidth didn't work.) and an open selenium rectifier in the antenna relay circuit. That's not to say that I haven't been inside the receiver on countless occasions and given it one "from the ground up" overhaul. But that was to optimize performance, not to restore life to a corpse. I think the first order of business ought to be to see whether you have a working receiver. If so, concentrate on one module at a time. Clean it up; get it going; and be sure it works before going on to the next module. If confronted with an R-390A of unknown condition, I would proceed as follows:

(1) Be sure the receiver has all its tubes in the right sockets. You don't necessarily have to test the tubes -- just be sure that there's really a 6AK6 in the V603 and V604 sockets, etc. Be particular to check that there is a 3TF7 in the RT510 socket on the IF subchassis. (If not, there should be a resistor wired between pins 2 and 7 of that socket.) (Alternatively there should be a short between pins 2 and 7 of RT-150 AND BOTH V505 and V701 should be 12BA6s not 6BA6s.)

(2) Take a good look at the power supply and be sure that you have two 26Z5's in the sockets, OR (more commonly) that these have been replaced with silicon diodes. Be sure the diodes are properly connected. (Arrow to pin 1 and/or 6 of the tube socket, bar to pin 3 and/or 8.)

(3) Pull both the plug-in electrolytic capacitors (C603 and C606) on the AF subchassis one at a time (so they go back in the right socket). Inspect these for deformity or physical leakage. If they look OK, measure each section with an ohmmeter. They should read at least 50k. If they are physically damaged or fail the ohmmeter test they have to be replaced before powering up. Otherwise, just stuff them back in.

(4) A word about the notorious C553 on the IF chassis. It is not especially prone to go bad but it has developed a nasty reputation because, when it is shorted, it applies B+ to the mechanical filters -- killing them dead. If I were inexperienced on the R-390A I'd play the odds that mine is one of the 99.9% of all R390s in which C553 is as good as the day it was made. If I were more neurotic, it is the ONLY capacitor I would replace as a precaution before firing up the receiver. It is fairly easy to get to and should be replaced with a BRAND NEW .01uf 400 wv ceramic or mylar capacitor.

(5) Be sure all the interconnecting power and RF cables (including the devilish little mini-BNCs) are properly connected. (Note, P218 goes to J518, P213 to J513, etc. so there's some logic to it.)

(6) Check the fuse(s) on the rear panel. The AC line fuse F1 should be 3 amps and is present in all models. Later models also have two B+ fuses. F102 should be 1/4 ampere and F103 should be 1/8 ampere. These can be a troubleshooting aid. If F103 is blown, a component in one of the subchassis B+ circuits is drawing too much current. If F103 is OK and F102 is blown C606 is probably bad. If both F102 and F103 are OK and F101 is blown, suspect a short in the power transformer,

rectifiers, chassis wiring, filament circuits or oven heaters.

(7) There are two barrier strips on the rear panel. Be sure that jumpers are installed between the following terminals: 1-2, 3-4, 11-12. The receiver won't yield any output unless these are in place. A jumper is also normal between 14-15, but that affects the Line Output mode only. (See Figure 2-2 in the Y2K Manual.)

(8) While you are at the rear panel, set the OVENS switch to OFF.

(9) Inspect the AC line cord for shorts.

(10) Ground the chassis to a reliable AC ground.

(11) You are going to need a 600 ohm speaker or high impedance headphones. Connect the speaker between terminals 6 and 7 on the rear panel barrier strip. (Use of a low impedance speaker won't damage the receiver, but you aren't going to hear much audio.) The headphone connection has a series resistor of 6800 ohms, so don't expect to hear much of anything if you jack a set of 4 ohm "hi-fi" phones into the front panel.

(12) Connect an antenna to one pin of J104. Ground the other pin.

(13) Plug in.

(14) Power on.

With the RF GAIN and LOCAL GAIN (audio) wide open, the FUNCTION switch set to MVC and the LIMITER OFF, you should hear something at this point â€” even if it's only shot noise.

If not, check for B+. If that's good, check the audio subchassis.

If there is noise but no signals are heard: (1) rotate the bandswitch to be sure that you are getting a noise peak in the detent position â€” if not, the crystal oscillator switch indexing is off; (2) do the same with the BANDWIDTH SWITCH â€” if the wafers don't line up, the switch won't reliably "make"; (3) check the oscillator tubes first V207, V401 and V701 substitute known good tubes; (4) then check the 6C4 mixers V202, V203 and V204.

A set of tube socket adapters is invaluable for troubleshooting a dead receiver. Just remember that if you are using the kind with exposed terminals, be sure they aren't shorting against an adjacent IF can.

Once you get the receiver going and gain some familiarity with it you can tackle the big projects like recapping or overhauling the gear train. But these jobs are not for the faint of heart, nor can they be accomplished in a weekend. And don't be tempted to work when you are bleary-eyed with fatigue. That's an invitation to disaster.

Finally, you should regard the mechanical filters, the switches, the crystals and the mechanical parts as IRREPLACEABLE. Be extra careful not to damage these or you are going to have to spend a lot of time and not a little money looking for replacements unless you have charitable friends with well stock junk boxes.

Miles Anderson, K2CBY

Subject: Re: [R-390] Dead R-390A Update

After you do a thorough visual inspection, then check for proper voltages out of the power supply, after that check to see that the local oscillator is running. Next I usually start pulling or wiggling audio tubes while listening for any noise from the speaker then work my way up the tube line up.

Date: Mon, 21 Feb 2005 10:15:38 -0500 Date: Sat, 19 Feb 2005 21:24:51 -0600
 From: "Bill Keller" <kellerfamily01@charter.net>
 Subject: [R-390] More on Dead R-390A

Many thanks to all the people who have given me advice. The 3TF7 checked out fine But something else has changed since I first reported the problem. At first, I was getting no signal period on any band under any conditions or control settings. Now, all of a sudden, I have started getting very weak signals on all bands that I have checked so far, but only with the BFO on and both gain controls turned all the way up. With BFO off, I still get nothing. Before this radio went dead, I was running it 24/7, because if I didn't, reception would get very weak or disappear altogether on bands below 8mc. I wonder if that problem and this one are related? Bill K.

Date: Sun, 20 Feb 2005 00:16:30 -0500
 From: Bob Camp <ham@cq.nu>
 Subject: Re: [R-390] More on Dead R-390A

It sounds like you have multiple problems on the radio. That always makes troubleshooting things a bit tough. The "everything below 8 MHz dead" problem is normally the 17 MHz oscillator not firing up. It won't kill the whole radio though.

I would strongly recommend starting out with what ever test gear you have and doing some basic checks. Even a cheap radio shack VOM and a downloaded copy of the Y2K manual will get you on the way to isolating what's going on. There are some reasonable voltage charts in chapter 5 (I think ...) of the manual that should be of help in figuring out where to start.

This is a tube radio and running it 24/7 will *eventually* break it

Of course they also are 100% repairable by normal non-rocket scientist beer drinking humans. Time to dive in!

Date: Sun, 20 Feb 2005 08:00:11 -0500
From: "Steve Hobensack" <stevehobensack@hotmail.com>
Subject: [R-390] Re: R-390A auction

Don't forget that the little missing plug-in holds the vital 17 mhz conversion osc xtal along with the 200 khz calibrator xtal. The radio will not operate without the plug-in.

Date: Sun, 20 Feb 2005 17:05:55 -0600
From: "Bill Keller" <kellerfamily01@charter.net>
Subject: [R-390] Dead R-390A Update

The situation with this radio is getting more confusing. I went through it and checked every tube substituting one tube at a time and found nothing - ended up leaving the old tubes in. I also checked all connections and replaced the can holding Y201 & Y203 - didn't help, so left original can and crystals in. So, nothing was actually replaced, but somewhere during the time I was doing the checking, the radio gradually went from totally dead to barely working. The strongest signals will now come in barely audible with the gain all the way up but still not strong enough to copy. If I turn the limiter on, they get slightly stronger. And if I turn on the BFO, they get even a little bit stronger, but still not strong enough to even hear unless the gain is turned all the way up. I can barely tell that signals are there, and that includes nearby broadcast stations. Nothing, of course, is anywhere near strong enough to even budge the S meter. This radio was totally restored by Miltronics a few years back and is exceptionally clean, so I know that it's well worth fixing if I ever get smart enough to figure out what's wrong with it. And if I have the time and space to take it apart to work on it. Bill K.

Date: Sun, 20 Feb 2005 15:17:48 -0800 (PST)
From: Joe Foley <redmenaced@yahoo.com>
Subject: Re: [R-390] Dead R-390A Update

Sounds like a loose connection somewhere, check plugs, wiggle things.

Date: Sun, 20 Feb 2005 15:31:34 -0800
From: "Dennis L. Wade" <dwade@pacbell.net>
Subject: Re: [R-390] Dead R-390A Update

Have a good look at the mechanical section of the RF deck....wonder if a gear clamp gave way all of a sudden. Watch and make sure all the slug racks move when you turn the Mc/s and Kc/s knobs.

Date: Sun, 20 Feb 2005 21:57:37 -0800
From: Buzz <buzz@softcom.net>

From: Bob Camp <ham@cq.nu>
Subject: Re: [R-390] Dead R-390A Update

The R-390- either one was built in the era of the VTVM. Most of the voltage checks on the radio are based on a high impedance measuring device. A VOM will give you different readings on *some* of the test points. VTVM's are not a real popular item any more. You see them come up on the auction sites or at flea markets for less than the price of a family lunch at Burger King. They also do not take up a lot of room in storage while you are not using them. If you don't already have one I think it might be a good idea to get one. They make the process you are diving into a whole lot easier.

On a lighter note - this is a perfect excuse to buy a second working radio. Then you could swap modules back and forth to find the problem. The purchase of the \$500 radio would save you the \$10 or \$15 on the VTVM.

Of course once you found the problem module in the radio, you would need a replacement. Now you need to buy a parts radio to swap in the module from. Now with three radios the investment in a signal generator makes sense. So does stocking a full set of tubes.

Date: Thu, 28 Dec 2006 14:32:22 -0200
From: "Kurt Schnabel" <classicmotorcycleclub@hotmail.com>
Subject: [R-390] R390A not working at all

Some years ago I had bought a defective R390 A receiver, all tubes were checked but it does not receive any signal. All voltages seemed to be ok too. The problem is probably in the front end, which I had already disassembled and check some resistors and capacitors. Does anyone had a procedure to verify the trouble with the front end of the radio out?

Date: Thu, 28 Dec 2006 10:49:19 -0600
From: "Barry" <n4buq@knology.net>
Subject: Re: [R-390] R390A not working at all

Do you have access to any of the technical manuals or the Y2K manual. These have troubleshooting guides that can step you through some procedures to help determine the stage(s) that are having problems.

Date: Thu, 28 Dec 2006 11:46:34 -0500
From: "Tim Shoppa" <tshoppa@wmata.com>
Subject: Re: [R-390] R390A not working at all

The Y2K has an official diagnostic procedure. Signal generator of any kind (even just the ones that make a raspy square wave all over the spectrum) will put you far far ahead of where you are now. Start injecting at the audio stage and work your way back until you don't hear the hash anymore. If your signal generator happens to do IF frequencies (e.g. 455kc) in particular, even better. Lacking a signal generator, knowing what noise from different stages (audio, 455kc IF, other IF's) sounds like would help you. "Completely dead" as you describe it (no hum, no noise anywhere) would have you starting at the audio stage, not the RF amp. If you are getting some noise, starting at the AF and pulling/re-inserting tubes will help you find where things are stopping. A simple coil on the end of a scope probe will help you determine that the oscillators and bandswitch are doing their stuff. You should see the PTO freq, the 17 Mc freq in the back corner going on/off at 8Mc on the Mc tuning knob, the correct frequencies for the 32 band at the main crystal oscillator bank, as you move the sniffer around. Checking the 17Mc oscillator going on/off at 8Mc is a very quick sanity check for massive misalignment of bandswitch. (But not a complete check.) Turning the bandwidth knob with a failed mech filter coupling capacitor will wreck all your mech filters instead of just one, BTW :-).

Date: Thu, 28 Dec 2006 14:40:05 -0800 (PST)
From: Joe Foley <redmenaced@yahoo.com>
Subject: Re: [R-390] R390A not working at all

Does it have any jumpers on the terminal strips on the back panel?

Date: Fri, 29 Dec 2006 11:49:44 EST
From: Flowertime01@wmconnect.com
Subject: Re: [R-390] R390A not working at all

While waiting for your copy of the Y2K manual to download so you have some schematics to work with you can start with the eye balls.

The old school house mantra was that receiver worked yesterday. Today it does not work there for it has one and only one problem. Method one is eyeball the problem to one stage and fix it. Method two was listen to it and isolate it to one stage and fix it. You eyeballed a dead receiver first because most days a tube had died. Next was a loose subassembly connector or a broken wire somewhere on the front panel. 50 years later here we have added failed capacitors to the short list. (pun there intended). Eyeballing got you past the tubes not being lit.

Moving the receiver around dropped the ballast tube filament the VFO and BFO filaments are not lit. Or the receiver did die back when the ballast tube failed and a replacement could not be found. Replacements still are hard to find.

Fix one is a jumper across the ballast tube socket and two new 12 volt 12BA6 in the

receiver one in the VFO socket and one in the BFO socket. The original filament string was 24 volts. at 6, 6, 12. Where 12 was dropped by the ballast tube to regulate the filament voltage of the two oscillator tubes which were 6 volts. The new string is 2 12's and a jumper. No trouble you are not on military power some where in the war world. Good old USA power is plenty steady for the receiver without a ballast tube. Read the Y2K manual for other ways to deal with a ballast tube. A resistor will work. You can rewire the IF deck to feed 6 volts from the other filament voltage source to power the VFO and BFO.

While every tube may check good you can have a socket or wire problem. Look at every tube one at a time Are the filaments glowing? Is the voltage regulator tube glowing? If these things are not true then you need the schematic to start getting very local and specific.

R390/A have had / have these plastic capacitors. About 3/8 dia and 1 1/2 long. Most are brown but are called black beauties of death. They crack and go shorted. They are mostly in the IF deck. A couple in the RF deck. Pull your IF deck and take a look. If your IF deck still has these old capacitors in them you will need to do some testing and replacement. Some Fellows just do every and get it over with. However with a dead receiver it is best to find and fix the problem before you shotgun a bunch of new ones into the receiver. This is just an aside from the eyeball inspection.

If all the tubes are lit then you can start listening to the receiver. In school, repairmen were taught to listen to a receiver. You can front panel a receiver down to a stage or two before you even pulled it out of the rack. I would first look in the back of a rack to eye ball the tubes. I liked the dark space because I could see the blue glow of the gassy tubes in the dark. Once I had the receiver back on the bench in the shop and it had been off and cooled down the gassy tubes did not always glow or have enough color to be seen in the shop even when shaded. Look at your receiver with the lights off. Set it up on one end so you can see the top and bottom in the dark and not be moving things around in the dark. <snip>

Roger L. Ruskowski AI4NI

Date: Fri, 29 Dec 2006 14:49:40 EST
 From: Flowertime01@wmconnect.com
 Subject: Re: [R-390] R390A not working at all Eyes Open

Eye ball four jumpers on the back terminal boards
 RF gain TB102 pins 1-2.
 Diode load TB103 pins 14 -15
 AGC TB102 pins 3-4

These things exist to allow the receiver to be operated in tandem with paired receivers.

Line audio TB103 pins 11-12. This one may be missing and the audio deck modified. This is not a showstopper. If one of the other is missing just strap a wire across the terminals.

Short TB103 pin 9 to ground with a wire to a chassis screw.
Do a nice job you will want to leave this jumper on your receiver.
Switch the break-in switch off and on

You should hear the antenna relay click.
You should hear the audio noise mute.
The break in relay pulls the audio at V601 to ground.
You should just hear the hum from V604.
Set the break-in switch off.

If the break-in is not working, check you have a good jumper on the terminal board pin. Leave this problem for later. That poor relay likely has not been powered on for years.

Set the function switch to cal and mgc. You should hear the antenna relay click as you go from MGC to CAL. If not then you do need to work on that problem. Passive off of the antenna relay is signal through the relay. A lightning strike may have fused the relay contacts. Again let this problem go until you at least have calibration tones on ever 100 KHz.

Set the dial to 7 +000 and look at the mechanical cam alignment.
Read the Y2K to see if your mechanical alignment is good. Once you know you remember.

Next check the band switch operation.

This is under the RF deck: it switched the six racks of RF transformers.
I call then octaves. One slug rack and three slugs in three cans per octave.
The bands switch at .5 - 1.0 band switch at 2.-3, 4-7, 8-15, 16, 32

As you change the MC knob you should see the band switch gears change.
Both going up the dial and down the dial.

Often a clamp will get loose, crack on a gear and drop the alignment.

There are several gears and clamps between the MC knob and the band switch.

NO FEAR you can change any clamps and reset any gear with out pulling the gear train apart.

The original TM says you can even set the band switch in the RF deck with out pulling the RF Deck. DO NOT DO THIS. If you need to set your band switch then pull the RF deck and do it by eyeball.

Several of the switch segments carry B+. You want the very best mesh and maximum switch contact on each wafer section and contact on each band setting. DO NOT try to adjust a wafer location of contact. You are just going to adjust for the best you can get. It's an average of everything from end to end. You want to eyeball that not pick a continuity check blind with a meter reading as detailed in the military

TM's.

As you dial across the KC band from 00 500 to 00 900 you watch slug rack 1 on the left go from bottom to top. As you dial the KC band from 01 000 to 01 999 you watch slug rack 2 from the left go from bottom to the top. As you dial the KC band from 02 000 to 02 999 you watch the slug rack 3 go from bottom to 1/2 way up. As you dial the KC band from 03 000 to 03 999 you watch the slug rack 3 go from 1/2 way up to the top The 04 to 07 999 takes four passes to make the travel from of slug rack 5 go from bottom to top. Slug rack 5 needs 8 passes from 08 000 to 15 999 to make it travel its range. Slug rack 6 needs 16 passes from 16 000 to 31 999 to make it travel its range.

Z216 travels bottom to top with each 000 to 999 KC ten turn of the KC knob pass.

Z213 bumps around with MC changes and moves a bit with the KC knob. There is a pattern to its behavior.

All you are looking for is to see everything moving like it should. You are just looking to see if a clamp come loose or a gear has slipped out of mesh.

This will get every thing out of sync in the RF deck. It will not hurt any thing the receiver just will not work.

If your receiver passes all this eyeball then its time to put on the head phones and listen to it.

More to follow. Roger AI4NI

Date: Fri, 29 Dec 2006 14:53:21 EST
 From: Flowertime01@wmconnect.com
 Subject: Re: [R-390] R390A not working at all Head Phones on

Head phones on
 Line meter switch to -10
 Band pass switch too wide.
 Line gain knob to max.
 Local gain to max.
 Switch the limiter switch off
 BFO band width to 16
 BFO switch on
 BFO pitch to + or - 1 but not at zero.
 Dial lock free
 Zero adjust off
 MC above 8
 KC to 400 500 or 600
 Function switch to mgc
 RF gain max
 Break-in off

Run line gain up and down and see if line meter wiggles
 If that meter needle gets off the peg V603 is OK.
 Leave the local line gain at max

On with the headsets.
 Run the local gain up and down.
 At max gain you should have some power hum in the headsets.
 Leave the local gain at max.

Flip the wide sharp switch
 If the noise changes then V602 and V604 are good.
 Leave the switch in wide setting

If the local gain changes the noise level the V601 is good.

Power supply is good you have V605 lit from visual inspection
 So you have 150 volts.
 You checked the B+ fuses so you think you have B+.
 You have some noise in the audio tubes so you think you have some B+
 You eyeballed the filaments so you think you have 6.3
 You eyeballed the connectors so you think the wire harness connectors are seated.
 You eyeballed the BFO tube in the IF deck (V505) so you think the ballast tube
 RT510 is good.

The Audio deck is good you have noise from all the audio deck tubes.

Switch the limiter switch on and off.
 You should hear a pop in the headsets and the line meter should twitch with the
 noise.
 As you turn the limiter up the noise should decrease. V507 is OK
 Leave the limiter switch off.

Set the function switch to AGC
 Play with the AGC fast slow and medium.
 Changing the switch causes the caps to discharge and pegs the carrier meter.

If the audio noise dies when the meter pegs, you are good to back some where in
 the IF chain.
 V506 is OK

Short the diode load to ground. This is like -7 volts DC on a good day. You should
 hear the pop of the DC circuit making and breaking as you short the back panel
 jumper to ground.

With the jumper shorted you should have a drop in noise.
 No pop is a problem between the diode load and the ears.
 No noise drop is a problem before the diode load not passing noise to get shorted to
 ground.

Hand a DC meter on the diode load.

Turn the BFO off. Load should be less than -10 volts.

Turn the BFO on. The Diode Load should go over -20 volts.

No increase in negative voltage from the BFO on the diode load is a BFO problem.

The BFO should be on.

Swing the BFO pitch from end to end. Do not force it.

The shaft clamp comes loose. The shaft turns the inductor one way but not the other way. Over time this winds the inductor over to one end or the other. This is another problem. Just do not break some thing else trying to fix the first problem.

You should hear a change in noise as you change the BFO pitch.

No change in noise. See V506, V504, V505 and RT510.

Turn the BFO off, Noise should drop.

No change in noise level is likely no BFO operating. (V505)

If the diode load changes voltage with the BFO switch on and off and you do not hear it in the headphones the problem is between the diode load and the headphones.

Play with the bandwidth switch the noise should change as the bandwidth changes.

Open P218 and P213 on the IF deck.

You should get a drop in noise. As you just unhooked the RF deck.

No change in noise leaves you working in the IF deck.

History tells us once you have all the tubes lit and just plain no signal from the receiver chances are that 8 of 10 will it'll be in the IF deck. 1 out of 10 it'll will be the RF deck, and 1 out of 10 it will be in the function switch antenna relay.

If the noise dropped off then its over to the RF deck.

Set the dial to 7 +000 and look at the mechanical cam alignment.

Read the Y2K to see if your mechanical alignment is good.

Once you know you remember.

Next check the band switch operation.

This is under the Rf deck it switched the six racks of RF transformers.

I call then octaves. One slug rack and three slugs in three cans per octave.

The bands switch at 0.5 - 1.0 band switch at 2.-3, 4-7, 8-15, 16, 32

As you change the MC knob you should see the band switch gears change.

Both going up the dial and down the dial.

Often a clamp will get loose, crack on a gear and drop

If the RF deck mechanical is working OK and you can not get a CAL tone on any 100 KHz any where in the receiver its time to get out the signal generator and volt meter.

Wait until you have read the Y2K manual until you get into this level of trouble shooting.

These two passes through the eyeball and hearing test should fix most problems where it worked yesterday and now I have nothing type problems.

Once you get back to a working receiver you then begin to work on having a very good receiver by doing alignment and replacing bad tubes. Along with that work you get to replace some old resistors and capacitors that have reached the end of their useful life. For your lifetime these are a do once project. The caps you place in a receiver today are likely to last another 50 years. Most of the ones in the receiver today have lasted that long. Resistors have been fried out of range by tubes being left in the receiver until the tube failed. The bad tube chars the resistor and its value changes (high). The tube got replaced and the resistor never was checked. They look OK to the eye. The receiver will meet signal to noise specification with several of these bad resistors and several bad caps in the receiver. Fixing these gets a signal to noise ratio in the receiver that exceeds specification. You do this stuff, as you want. You get motive by listening to noise in your receiver and know there are signals there you want to hear.

The real key is to read the Y2K manual and get to know your receiver from end to end. Once you get it working, keeping it working is much easier.

Do the two series of checks eyeball and hearing. When you get to a point that fails post a message to the reflector. Tell us all about the test you did and what you see of hear. We can then help you narrow it down one test at a time.

Tell us about your signal generator. Name will do nicely. You need a 455KC out put from it. If you do not have a signal generator FEAR NOT. That can be faked if you need to.

It's a McGiver thing. Do it easy if you have one. If not we can help you deal with it. We just have to DC test until we get a cal tone through the receiver. Then we use that with a DC meter on the Diode load for alignment and calibration. If you have a scope and frequency counter you are in real good shape. Again not needed but use what you got. If you just have a tuna tin transmitter and a voltmeter you can bring a R390 back to life and better its alignment.

It sould take longer to read this mail than to have performed all the checks detailed in this mail. Looking to read what you find. Roger AI4NI

Date: Sat, 30 Dec 2006 10:53:45 -0500
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: Re: [R-390] R390A not working at all Eyes Open

Boy, that brings back memories. But you forgot All Zeros. Dial receiver to 00.000. You should peg the Carrier Meter. Flip the BFO on to see if you hear a tone. This checks everything back from the headphones to the First IF Mixer (you are receiving the 17 MHz LO). If you have the meter pegged, then everything from V202 on is working, at least to some extent. That leaves V201 stage and the Antenna relay. Back in the day, it was common to troubleshoot down to the stage while the receiver was still in the rack, then just drop the proper tube in and move up the PM schedule.

Date: Sat, 30 Dec 2006 11:03:07 -0500
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: Re: [R-390] R390A not working at all

I was digging out my old ASA Class Handout to publish the Front Panel Checkout procedure when I saw Flowertime's first post. Thanks Flowertime for saving me a LOT of typing!!! Oh, and don't forget the Microswitch Fix if you are updating the manual. If you turn the receiver off, but the dial lights stay on, use a mallet or end of a scrap piece of wood to give the front panel a tap on the FUNCTION label of the Function switch. A whack or two will almost always knock loose the microswitch contact, resulting in years of troublefree service. Once I learned that trick, we never had to replace the microswitch again.
