

R-390A Basic Maintenance

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Are you a new proud owner of an R-390A receiver? Are you a first timer with this wonderful electrical and mechanical monster? Wondering what to do first? Here are my tips for beginners. I used this outline form for a workshop I conducted at the 2001 Dallas Collins Users meet. Hopefully it will get you started and prevent initial disappointment if your receiver has been idle for a long time. Standard disclaimers apply!

1. Assemble basic tools, equipment and supplies.

Tools: Bristol Spline wrenches #8, #6, #10, usual electronic hand tools, tube puller, Variac, inspection light source, dental pick, alignment tools, soldering iron. The Xcelite 99 tool set seems widely available from distributors.

Essential manuals: The Y2K manual, Navy or Army TM, or all three.

Essential equipment: VTVM, Sig. Generator, AC Voltmeter. DVM, 600ohm speaker

Supplies: De-oxid, rags, paper towels, Q-tips, a bottle of patience.

2. Perform basic checkout and clean up.

Do a visual inspection. Fix the obvious problems before proceeding. Any tubes missing? Clean it up! Make some notes, including serial number and contract number, manufacturer's names, any unusual mods or oddities.

3. Fix the easy problems first.

Most common problems are bad capacitors, open or out of tolerance resistors, corroded contacts, previous owner mangling. Other common problems: Wrong size fuses, wrong or bad tubes, loose hardware, mechanical binding, cabling or connectors, mis-alignment, bad crystals, open or missing ballast.

4. Replace the Filter Killer Cap.

IF deck, C-553, originally .01 ufd at 300 vdc, blocks DC to the mechanical filters. It is a known weak component. If it fails, it will damage one or more of your filters. Replace with a .01 600V orange drop. See picture examples.

5. Replace the Rotting Cap.

AF deck, C-609. This cap rots, will damage the circuit board underneath it as well as the cap. This is an 8ufd 30V electrolytic on a bad acid trip. Use an 8 or 10ufd 35V electrolytic replacement. Mouser 74-150D35V10. Negative lead connects to the side of the terminal board that has the wires exiting from the board. See picture examples.

6. Rebuild the power supply electrolytic caps.

AF deck, C606, 2 X 45 uf 300V, and C603 2 X 30 uf 300V. Both are plug in type and can be rebuilt. If you must replace, save the old one, and use a relay enclosure or tube base. Several suppliers offer replacements or will rebuild yours.

7. Replace the BBOD (black beauties of death) caps.

Black beauties, if you find them in your 390 are guaranteed to be leaky. Brown beauties, as well. All old paper caps are bad or working their way toward being bad. They can't help themselves, and they will never get any better, only worse. These leaky caps will cause noise, pops, poor performance, overheating. Acidic paper is the problem, and nothing you can do will fix a leaky cap.

8. Turn off the Crystal ovens.

This reduces the power consumption by 1/3, and your receiver won't cook itself needlessly. Leave on if you are operating from the North Pole.

9. Basic Alignment

Check PTO end point calibration.
Check mechanical alignment of RF deck.
Do IF and RF alignment.
Check receiver SN+N sensitivity.

10. Lubricate Gear Mechanism

Leave the WD-40 on the shelf and use a quality motor oil, sparingly.

Hints and Kinks

Antenna.

Use a balanced to unbalanced adaptor for your antenna.

Antenna Connectors:

Balanced antenna connector UG-971/U to unbalanced coax UG-573 connector

Balanced antenna connector UG-970/U to unbalanced coax PL-259 connector

Unbalanced antenna (long or random wire) C Type UG-573/U for RG-8

Use a computer TwinAx connector. There are thousands of these unused in office buildings where an IBM 3270 network was once installed. Recycle them! Build a pigtail adaptor to whatever common connector you use. Or find a twinax balun that terminates in a BNC.

Use a random long wire with the C connector.

Audio.

Use an external audio amp connected to the diode load for hi-fi audio.

Use a 600 ohm to 8 ohm transformer if using the built in local out.

Radio Shack 32-1031B line transformer (8 or 10 watt tap)

Hammond 600 ohm unit from AES.

Power.

Ballast Tube replacement: Use a 12BA6 at the VFO and a jumper at the ballast socket.

Do the cheap, easy, removable Lankford AGC mod for improved SSB reception

No hacking necessary.

For best life, run your receiver at 115V AC input by using a Variac or line bucking transformers to knock down typically higher line voltages.

Housing.

CY979/URR is the official cabinet accessory. They are uncommon.

For rack mounting, allocate 10" Rack space and 21 inches depth.

Covers need to be removed for rack or cabinet mounting.

Radiation.

Missing meters? Gov. demilitarized and protected us from these sometimes radioactive devices.

Audio Level Meter RA226 .69uCi

Audio Level Meter Ra226 .40uCi

Electron Tube OA2

EEVC U238 .1uCi

CBS Hytron Ni63 .5uCi

Raytheon Co 60 .2uCi

Best advice is don't sleep with the meters, or eat them or carry them around in your pocket.

Web Resources

<http://www.R390A.com/> Chuck Rippels R-390A Home on the Web. This is the granddaddy of R-390 sites. Chuck is the master.
<http://www.r-390A.net/> R-390A FAQ and lots of other useful info including the Y2K manual. Accumulated net wisdom.
<http://www.webdsi.com/nlee/> Nolan Lee's R-390A Master Capacitor and Crystal Lists
<http://www.knology.net/~wewilson> Walter Wilson's Hints, Kinks, Pictures, Procedures.
<http://davemed.com> Dave Medley's pages dedicated to the R-390 (not the A model)
<http://www.google.com> search engine. Google knows all.
<http://www.mailman.qth.net> R-390 mailing list subscription, choose r-390 list, give it your email, await instructions. Got a problem, ask on the list. Lots of help available.

Media and Print Resources

Electric Radio er@frontier.net
Hollow State Newsletter sanser@gte.net
Jeff's R-390 CD eengineer@erols.com
Radio Era Archives R-390 CD www.radioera.com
Hi-Res Communications R-390A Video and Supplements

390-A Restorations and Parts

Chuck Ripple Restorations wa4hhg@amsat.org
Rick Mish Restorations, Miltronix, Box 3541, Toledo, OH 43608, 419 255 6220
Walter Wilson Restorations <http://www.knology.net/~wewilson>
Dave Medley for the R-390 <http://davemed.com>
Mil-Spec Communication Milspec390@aol.com
Fair Radio: Parts, radios, manuals, tubes. www.fairradio.com
SSN www.surplussales.com
Dan Arney, reproduction knobs, covers, etc. hankarn@pacbell.net
Dave Curry Longwave Products for replacement filters www.75A-4.com
Ron Hankins SSB Adaptor for R-390/R-390A www.kk4pk.com
RF Connections. Connectors and cable assemblies www.therfc.com
www.ebay.com

Ebay Prices: www.aade.com/hampedia/prices2.htm

	qty	min	avg	max
R-388	12	\$152.50	\$381.29	\$711.00
R-389	2	\$2,000.00	\$2,525.50	\$3,051.00
R-390	11	\$200.00	\$410.66	\$766.00
R-390A	12	\$177.50	\$564.67	\$1,000.00
R-391	5	\$450.00	\$760.60	\$998.00
R-392	8	\$100.00	\$215.06	\$401.00
R-648	1	X	\$416.11	X

Approximate Production Values R-390 series

R-389	734	
R-390	16,900	
R-390A	54,000	1951-1984
R-391	1,440	
R-392	25,600	
R-725	300	

R-390A Manufacturers

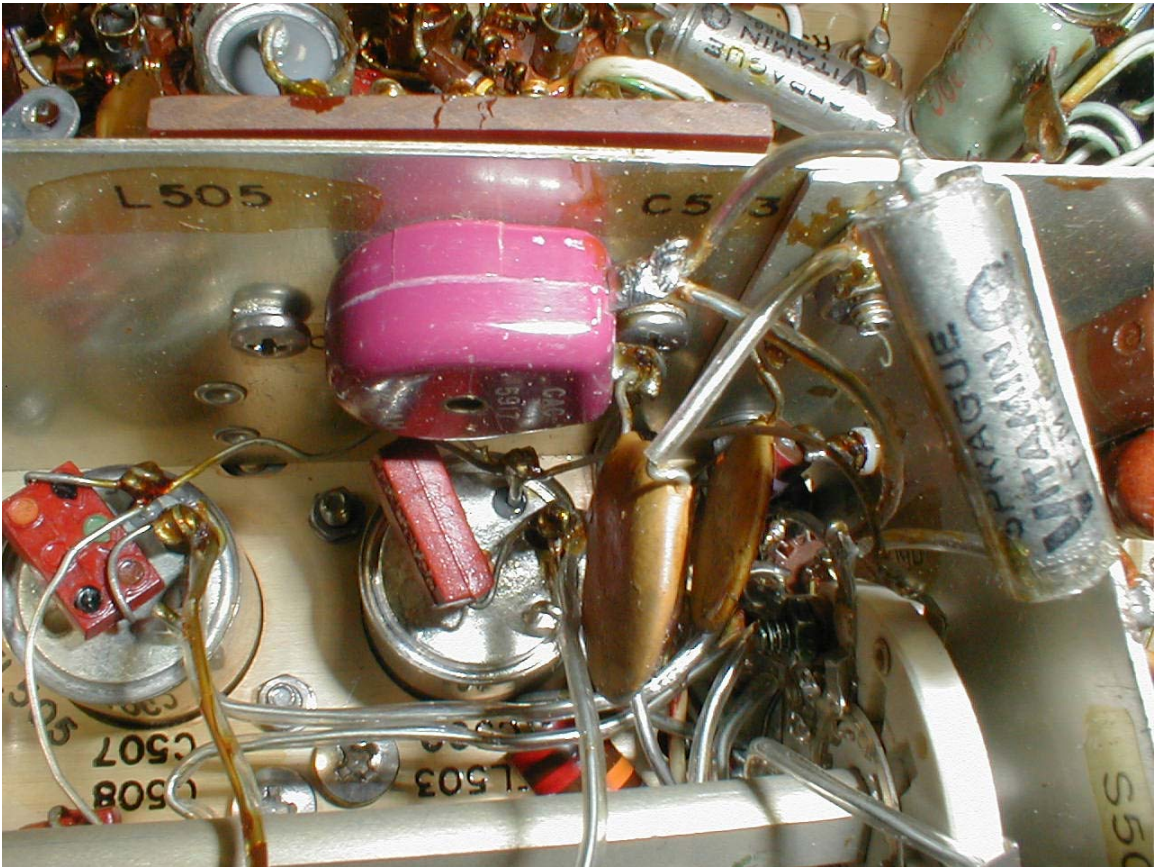
Adler, Amelco, Arvin, Capehart, Clavier, Collins, Columbia, Dittmore-Freimuth, Electronic Assistance Corp, Fowler, Helena Rubenstein, Imperial, Manson Labs, Motorola, Stewart Warner, Teledyne.



Made in the USA

Picture Examples:

The IF killer cap. It's the one to the right of L505, the purple coil.



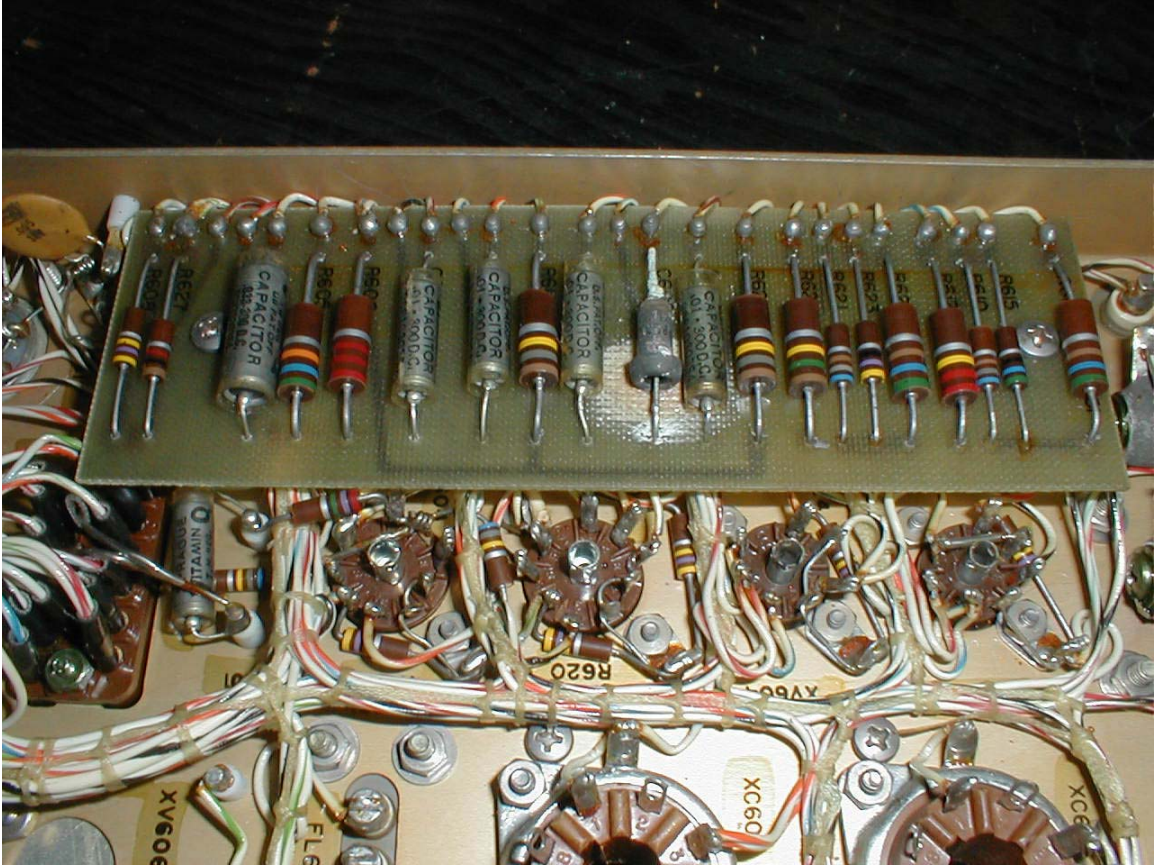
Here is the same if deck with the cap replaced with a 600V orange drop. Note that the Teflon spaghetti insulation is retained for use on the new cap. It's a tight spot so don't forget to insulate the leads.



And another view.



Here are some examples of the rotting cap on the audio deck. Note that this one is already eating up the circuit board.



A close up of the cap.



Another audio deck with a rotting cap. This one hasn't started on the circuit board yet but it will if we don't get it replaced.



Here is what a replacement cap looks like. Note that the circuit board was cleaned and scrubbed to remove the acid from the leaking cap before the replacement was installed.

