R-392 Hints, tips, and mods

Last updated: November 22, 1999
Disclaimer: No warrantee provided, your mileage may vary

Power Supply

Unless you are using a 28 volt military vehicle electrical system, you'll have some kind of external power supply for the R-392. The nominal supply is 28 volts at 3 amps. Of this, 2.5 amps is for tube filaments, 0.5 amp for plates. While the manual reports full sensitivity at supply voltages of 25 and above, many people report improved RF performance by running the plate supply at 28 to 35 volts while keeping the filaments at 28 volts. It has been my experience that the receiver, when properly aligned, meets its sensitivity specifications at 26 to 28 volts on a combined filament/plate supply.

Al Marshall reports that it is possible with some minor modifications to run the filament string on 28 VAC, reducing the regulated 28 VDC power requirement to 500 ma. The mod consists of lifting one end of the antenna relay coil. DO NOT USE THIS MOD IF YOU HAVE THE SOLID STATE AUDIO MODULE -- It runs on the filament, not plate circuit.

There are some military and commercial power supplies, with beefy outputs suitable for running a room full of R-392s (and prices to match), that are available from Fair Radio and other sources. Examples include Lambda (28V, 19A, 62 lbs, $195), PP-2309C (0-36V, 15A, 75lbs, $145), and PP-4763/GRC (28V, 50A, 145lbs, $195). A variety of less expensive alternatives include the PP-3700/PRC-41 (24-28V, 4.5A, 15 lbs, $35-$50), copier switching and linear power supplies in the 25-30V range, as well as homebrew designs.

Sensitivity, Intermod, "Scotch" S-meters

Some problems with sensitivity (and unresponsive S-meter) can be traced to weak tubes, leaky caps, or out-of-spec resistors, particulary those in the S-meter bridge circuit (V502, R509, R622, R621, R512, R624, C714, C624). A common problem is a leaky C509 in the cathode circuit of V502, the 2nd IF. Tubes in the RF/IF chain should be checked by substitution; tubes that test OK on a tube tester can still have dramatically different in-circuit performance. Place "hotter" 26A6 tubes in the 1st & 2nd RF Amp, and first few IF stages. The 26FZ6 can be substituted for the 26A6 in the RF/IF amps for an increase in sensitivity. (Paul Bigelow and George Rybicki)

While I don't experience problems with intermod, some folks do. Step one

in reducing these problems is keeping VHF/UHF energy out of the front end with a regular amateur or CB low pass filter. These filters pass RF energy below 32-35 MHz to the receiver and keep all the FM and TV stuff out. Proper alignment and putting "select" 26A6s as the RF amps is another step. And double check your AGC chain. The first RF amplifier has its own AGC circuit; the other AGC circuit controls the 2nd RF, following IF stages and metering circuit.

Always check suspected intermod with another receiver. It is possible for the intermod to occur OUTSIDE the receiver -- bad electrical connections in antennas, feedlines, power and telephone wiring, even fences and aluminum gutters.

Solid State Audio

Vacuum tube purists will probably want to skip this section.

The final AF audio output amplifier tube is a 26A7GT. This tube consumes 16 watts of filament power (26.5V, 600ma) to produce only 200 milliwatts of audio output. Helps keep the radio nice and warm, too. A number of plug-in solid state audio replacements have been made over the years. They all provide greater audio output and consume less power than the 26A7GT. The greater output is obtained without overloading the B+ circuit by using the beefier (in amperage) filament circuit. Here is the schematic of the "official" solid state audio module. As previously noted, don't try the AC filament mod if you have a solid state audio module.

If push comes to shove, and you really can't round up the requisite number of 26A6 or other tubes, a 40763 MOSFET can be more or less directly substituted in the signal and B+ path. Or so it has been said. Hey, I *told* you that you might want to skip this section. For the record, my R-392's are completely tubed at the present time.....

Barry Hauser has a R-392 which has been completely converted to solid-state active devices and to 12 VDC vice 24-28 VDC. Don't blame him either, it was that way when he bought it. The front panel has 3 of the fuse holders (plate and 2 spares) removed (in addition to all panel markings being painted over). The IF/AF/PTO/Calibrator modules clearly show tubes replaced by either single transistors or IC modules. Barry is currently collecting some basic performance data to see how this radio performs vis-a-vis the original R-392 specs.

Return to R-392 Technical Data

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from http://users.erols.com/mdinolfo/r392id.html

R-392 suggested modifications by Jeffrey L. Adams

This page last revised on March 24, 1999.

OK, you've gotten this far; apparently you are not totally adverse to modifying this radio. So far, the only revision which I've made to my own R-392 has been to replace the tube shields with IERC-type shields. This should serve to dissipate the tube heat a bit better, and extend tube life somewhat.

Here's a list of additional suggested mods. I have not yet performed any of these mods on my own R-392, but they are all "in the works" (I can hear you saying "Yeah, right..."). As I complete each mod I will modify this page to so indicate (and to discuss the results). Note that the main thrust of these mods is to reduce the internal heat load (about 64 watts for filaments alone, with a 26.5 volt supply!)

Replacing crystal calibrator with solid state unit: This mod should be pretty simple. Recent editions of the ARRL handbook, for example, provide details of a digital-IC-based crystal calibrator (perhaps using a 4 Mhz clock crystal). Should be relatively inexpensive; would reduce internal heat load (by eliminating V701, V702, and V703) by about 5.8 watts.

Replacing audio stages with solid state line-level driver: This would require that the audio be driven to "listen-able" levels by an external audio amp. For me, this is a simple task; I've got a set of "computer" speakers with an internal audio power amplifier. These speakers accept line level input (about a half volt RMS across 2 Kohms) and drive the speakers to a few watts output. To implement this mod, I will have to provide a solid-state driver circuit within the R-392 to drive the external amplifier (input Z of a few K ohms). Assuming that the power requirements of this R-392 internal "line level" driver stage(s) would be minimal, the elimination of V606, V607, and V608 would reduce internal heat load by about 18 watts. (If you have a solid state audio output module, this may not be as much of an issue. But the "stock" 26A7 vacuum tube output stage [V608] puts out only 200 milliwatts of audio while consuming 16 watts of filament power, so it's something of a pig.) Note that the filament circuit to V601 would require modification (unless V601 were also removed; this is discussed below).

Remove V601, V602, and V603; replace the diode sections with solid state diodes (perhaps 1N914 units?). This would result in loss of the 455 khz cathode follower stage V601A; perhaps this could also be replaced with an equivalent solid state circuit. Filament wiring to V606 and V607 would require rewiring (unless this mod was done in conjunction with the elimination of audio stages V606/V607 as described above.) Heat loss reduction = 5.7 watts. Note that this mod might be easy to try in "baby

steps": the 1N914 diodes could be soldered to short lengths of #18 AWG solid wire, which would then be inserted into the V602 and V603 tube socket contacts to test suitability.

If all these mods are implemented, they should serve to reduce the internal heat load by almost half. This would probably increase the lifespan of many of the internal components.

Solid-stating an R392

This page last revised September 9, 1999.

The following is copies (admittedly, edited) of some correspondence which I exchanged with a visitor to my website. I've tried to contact the other person for permission to post this information publicly, but have not had any response, so I'm not including the other person's name (I'll just refer to him as "John Doe"):
The correspondence began when I received the following email. For the following email, the writer was making references to some of the text on my R392 web page as it existed at that time:

email from John Doe to Mike Dinolfo dated April 5 1999:

>Replacing audio stages with solid state line-level driver: .....

I've already done this -- I'll dig up my notes and send them to you. No soldering required. All mods replace existing tubes.

>Remove V601, V602, and V603; replace the diode sections with solid state diodes (perhaps 1N914 units?).....

I've done this mod too..... After you replace the AM detector and AGC Detector you can add a mod to increase the BFO drive level. I'll dig this mod up also. I may have to open up my '392 since it has been 15+ years since I installed these mods.

The result is a great reduction in 28v supply requirements.

Both the first and second mixer tubes can be replaced with 2N3819 or 2N3823 JFET's. Both should be available at Radio Shack. FET should "plug" right in -- no additional mods or parts required.

The 26A7 can be replaced with a pair of darlington NPN power transistors. I used bargain basement to-202 types of unknown origin. Bias resistors were added.

The 6AJ5 audio stages can be replaced with 2N2222 or 2N3904 NPN types with a couple of resistors added to set correct bias.

The detector diodes should be replaced with germanium types -- 1N34, etc.

The result of of all these mods was much less heat and current with only slight increase in audio distortion at low freq -- probably due to output transformer or phase invertor imbalance. If the r392 is working correctly with the tubes there will be no loss in performance after switching to solid state.

If you are interested I'll scan my notes and EMail them along.
end of April 5 1999 email from John Doe to Mike Dinolfo
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email from John Doe to Mike Dinolfo dated April 6 1999; a lot of additional information is provided. Again, references which John makes are to some of the text of my R392 web page:

(1) FET Mixers - The 26C6 tubes are poor at best. I couldn't find any difference replacing the tubes with 2N3819 fets. In fact, the 26C6 mixer tubes look exactly like the 2N3819 when modeled at 28v. I soldered pins from a cannibalized DB-25 male to the FET leads and just plugged 'er in. I have a 2N3819 at v204 and a 26C6 at v203. Must have run out of 2N3819!

(2) 26A7 - I used a pair of Ge D43D Darlington to-220 power transistors. 130 ohm bypassed with 0.1 uf in the emitter leads. Bias resistor between collector and base of 2 meg ohms. To reduce chance of oscillation, the bias resistor has 220 pf across it. I built the thing on a piece of proto board and glued it to an old octal tube base.

(3) More Audio - I built an external 10w HiFi audio amp to really liven things up. I chose not to modify the radio to increase the audio power.

(4) V607 6AJ5 - 2N3904 with 1 meg bias resistor from base to collector.

(5) V606 6AJ5 - 2N3904 with 2 meg bias resistor + 1.5k unbypassed emitter resistor.

(6) V602 and V603 12AU7 - Germanium diodes. I used what I had in my junk box, 1N101. Silicon diodes may work better for the AGC rectifier I just didn't try them. The detector coils will have to be repeaked with the new detector diodes.

(7) V601 12AU7 - I have a germanium diode on pins 1 and 3. Nothing for the other half of the 12AU7.

(8) V605 6AJ5 - empty - I have tried a 2N3819 fet here. Works OK but really not satisfied with squelch action.

(9) BFO output mod - 220 pf from pin 5 of v604 to ground. Value was determined by trial and error!

RF and IF stage mods -

It's hard to replace the RF and IF tubes without messing things up. The solid state replacements have too much gain and cause oscillations. After some experimentation, I gave up! The RF and IF stages are what "makes" the R390/392 receivers. I couldn't justify further work.

Ramblings.....

It's real easy to get too much gain with solid state replacements for the 28 v tubes. My brother and I built a test jig so we could evaluate the 28 v tubes as fets on the curve tracer. That's how we came up with the 2n3819 replacements. Matching the gain and agc action of the 26a6 used in the IF and RF stages is nearly impossible. It's like a juggling act!

I once ran the b+ on 3 Kodak Ultralife 9v batteries.

Tube equivalents -
26a6 <-> 6ba6
26d6 <-> 6be6
26c6 <-> 6BF6/6BU6

The 28 v tubes are characterized at 28 v b+ and 250 v b+. We tried a 6ba6 at 28 v b+ and it behaved just like a 26a6 did at 28 v. Surprise!It should be possible to replace the 26a6 and 26d6 with their 6v or 12v equivalents and run the filaments on 6 or 12 v. I entertained ideas of running the entire radio on 12 v by replacing the tubes and building a 12v to 24v converter for the b+.

Somewhere, many years ago, I received a case of 26d6 tubes. The person I got them from did not know what they were used in. Neither did I at the time!

This stuff was done around 1980. I have not done any further work on the R-392 since then. A few years ago I retired the R-392 -- I got a TS450 with a general coverage rx.

My R-392 is a Stromberg-Carelson made unit. The tube pullers and and all of the special tools were still inside. (portion of text deleted)

My feelings are that the mods should be easily reversible and should be nearly as good as the original receiver. I understand there are other R-392 out there that have been modified to the extreme and are not reversible.

>From a purely engineering perspective, it should be possible to replace every tube in the R-392 by simply plugging in transistors or FET's. The tubes operated at 28 v have no advantage that I can see over solid state parts. Properly done there would be no difference between the original and modified receiver.

In many ways, my R-392 sounded better than the R-390A in my shack. I'm sure the 10w external amp helped some!

end of April 6 1999 email from John Doe to Mike Dinolfo

Date: Mon, 20 Dec 1999 21:30:26 -0600
From: "Robert Nickels" <ranickel@mwci.net>
Subject: [R-390] R-392 tuning

Long-anticipated R-392 arrived today but having not really played with one a lot, I need a reality check on the Kilocycles tuning control. Mine turns VERY hard, (much more so than an R-390), and there is a "dead band" when turning it either direction before the PTO actually moves. The "feel" is like the shaft is made out of rubber!

I pulled it out of the box and about all I can see is the expected gears turning, nothing real obviously wrong like busted parts falling out or anything...

Can anyone confirm that the KC tuning isn't supposed to be this way, and of course any suggestions about where to look would be appreciated as it looks like I'll be delving into the mechanics a lot soon than expected. Hey, the rx works great otherwise, at least!

Date: Mon, 20 Dec 1999 23:15:09 -0500
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R-392 tuning

I have three R-392's, but had similar symptoms with an R-390 non-A which was also a new arrival.

Go back, take another look at the gears, but also further back at the PTO shaft linkage. There should be an intact Oldham coupler there, I think. This is a three part cylindrical gimmick. The ends should be secure on

their shafts with a bristol/spline set screws. The middle part floats to allow the shafts to rotate in synch without being perfectly aligned. On that non-A, one end slipped back on its shaft and the middle piece was cockeyed. The KC knob turned but was tight and bound up and skipped at certain points. The assembly should be flush and fairly tight -- just a little play.

There should also be an anti-backlash spring that hooks onto posts on the two outer parts. If the coupler has slipped apart, chances are this spring is missing, but it should work without it. Shake the case -- might be a small spring and some other odd hardware in there.

You have to be careful that you're not turning the PTO past its endpoint, which can cause damage if the coupler isn't set up right. If it's loose or messed up, you'll need to reassemble and synch it according to the manual. There is a certain amount of over and under-range on the PTO, which can vary a bit by unit. This should correspond to the "plus" and "minus" end ranges of the Veeder Root counter.

Don't knob twiddle too much until you fix it. It should turn fairly smoothly. If it isn't the coupler or gearing, you may have a bound-up PTO based on other posts I've read here -- not personal experience.

You didn't say where you got it. Was this a Fair Radio repairable or checked unit? If so, you'll want to contact Dave there. They back what they sell. If it came from them, chances are the control was smooth enough when it left. That's what happened to my non-A -- the Oldham coupler somehow came undone in transit. Hope this helps, Barry

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Date: Tue, 4 Jan 2000 19:38:29 EST
From: PABigelow@aol.com
Subject: [R-390] R-392 measurements questions

I have seen several sets of measurements for the R-390a but not for the R-392. Has anyone performed a set of measurements? How would it compare to a R-390a (or non-a) for noise, sensitivity, blocking, IP3, filter shape, dynamic range, etc. Too bad Sherwood Engineering did not run tests on the set when their list was compiled!

Has anyone else used a PP-2953 (26.5v 20Amp) made by Digital to power the R-392? It seems to work very well and makes for a very impressive looking combination! Would anyone have a schematic for this unit or a spare ventilation fan for it?

Finally, a BIG "Thank you" to EVERYONE who responded concerning R-392 front panels. If anyone has any spare audio connector covers or the

IF cover I would appreciate hearing from them!

Date: Tue, 4 Jan 2000 19:49:03 -0500
From: "Ronald Reams" <wa4mjf@worldnet.att.net>
Subject: Re: [R-390] R-392 measurements questions

The PP-2923 should run very easily with the 392 as I recall the receiver only draws about 4 amps.

Subject: [R-390] Re. R-392 heat buildup

Hello, Tom! How does the R-392 survive the heat buildup in that sealed cabinet? VERY tenuously, lemme tell ya! R-392 cooling? WHAT cooling???

The first time I opened mine (it was working at the time, BTW), I got hit in the face with the POWERFUL stench of burned insulation! Turned out that this smell is normal for a 392 however; I've seen the same thing in several radios since.

In the R-392, the main heat source is the audio output tube; that thing's filament runs hotter than the hinges of hell! I surmise that the fried transformer smell is a combination of 2 factors: (1) the base of the output tube being cooked, and (2) the radiant heat from the tube cooking the antifingus glyptal varnish on nearby surfaces.

Surprisingly tho, the radio I have has never had a failure, heat related or otherwise, and it stays in very good calibration and alignment in spite of the baking it gets from that tube.

Several times I've considered putting together a solid state PA stage to plug into the tube socket, just to reduce the internal temperature of the radio, but it doesn't seem to warrant a high priority on the "to do" list; the silly thing just keeps running on and on, like the Energizer bunny

There occasionally appears upon the surplus market batches of solid state audio modules for that very purpose; apparently, somebody out there thinks reducing internal temperature is a good idea besides me. However, I have held off on buying one, because word has it that they only work on SOME of the R-392s out there; they seem to match only certain subcontractor's radios. With MY luck, they wouldn't work in my Stromberg Carlsen. 73's, Tom, W9LBB

Date: Sat, 14 Feb 1998 11:31:32 -0500
From: Will Schendel <n8azw@concentric.net>
To: r-390@qth.net
Subject: Re: [R-390] Re. R-392 heat buildup

When I first changed the dial lamps on my R-392, I took a sniff and thought what is wrong with this radio? It works fine, but smells like something is overheating. I opened it up, and the smell seemed to

come from around the audio tube area. To make sure, I dropped the front pannel, side pannels, pulled the audio/IF section out. Looking for discolored resistors, burned sockets etc., I found nothing.

My radio is a Western Electric, the one with the finned cabinet. I was looking in the Fair Radio catalog and saw a solid state audio module made by WE. Their ad stated this module works best in Western Electric sets. I thought for $27.50 it would be worth a try, because the case does get a bit warm after several hours. I called Fair Radio to order one the these little beauties, and the said they were all out of them. I asked again, are you sure you don't have any? They said we sold the last ten to the Japanese. I knew the Japanese were buying old Harley Davidsons, but what are they doing with all the WE R-392s, and the audio modules? No wonder the Western Electrics are so rare. Anyway, I have discovered that my radios seems to run much cooler at 24vdc than at 26vdc. This one is sensitive enough that I can get away with 24 volts.

Subject: Re: [R-390] Re. R-392 heat buildup

In the 70's it was reported that the 392 performed better with 24 volts for the heaters and 32 volts for the plates. Had better dynamic range, which is not really great because of the low gain per stage caused by the low plate voltage. The schematic of the solid state module is in the Army R-392 book.

Date: Fri, 13 Feb 1998 14:04:10 -0500 (EST)
From: trinit69@idt.net (Tom Marcotte N5OFF)
Subject: [R-390] R-392 Cooling?

I tried to read with an open mind all of the rebuttals which prescribe fans etc for the 390A. Can someone please educate me as to how a R-392 survives in an airtight container?

Date: Fri, 13 Feb 1998 11:31:40 -0800
From: Colin Thompson <burkec@goldstate.net>
Subject: Re: [R-390] R-392 Cooling?

I often wondered about the 392 myself. Perhaps there is a bit of design compromise? Hard to imagine in mil spec gear. Personally, the heat issue is not about the 390 series tollerance for adverse operating conditions. My focus is in minimizing anything that might shorten the life of the reciever or it's componants. Excess heat does not help electronics. I would like to be able to pass my 390s on to a younger enthusiest some day. Preservation of these great receivers is the issue, and I sincerely believe we are all charged with this responsibility. 73, Colin

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Date: Fri, 13 Feb 1998 15:58:09 -0500 (EST)

From: "P. J. Rovero" <provero@connix.com>
Subject: Re: [R-390] R-392 Cooling?

Quite nicely, but the 26A6GT gets mighty hot. Mine are on for weeks at a time, outside of case gets warm but not hot. No fans, no vents, *but* pretty massive case, all aluminum for decent heat conduction.
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Date: Fri, 13 Feb 1998 15:07:50 -0600
From: "Dr. Gerald N. Johnson, P.E." <geraldj@ames.net>
Subject: Re: [R-390] R-392 Cooling?

At 28 volts, not much besides heaters and the 28D7 gets hot in the 392. As it was made for an amphibious jeep application and other such outdoor applications, being sealed to keep out the sand and mud is better at keeping it running than being concerned about heat. The associated transmitter came with reversible vents, to be mounted in the open position for dry applications and to be sealed for when it was raining and splashing. There was a lot more heat created in the transmitter!

Date: Sat, 14 Feb 1998 08:55:34 -0600
From: "Dr. Gerald N. Johnson, P.E." <geraldj@ames.net>
Subject: Re: [R-390] Re. R-392 heat buildup

There is a solid state audio output module covered in the Army manual for the 392. I don't have either radio or manual now.

Date: Wed, 2 Feb 2000 17:01:50 -0400
From: "Jeff Adams" <jadams@mcqassociates.com>
Subject: Re: [R-390] recap a R-392

> It seems prudent to replace caps, as suggested by Mike Dinolfo's web site.
> Question is: what kind of caps - all orange drops? What voltage?

I would use Orange drops or metalized film for the mica's and Silver mica's

> Are gold rated resistors worth the extra $$$?
I would use metal film resistors if you could - almost the same as carbon film in price w/ better performance. I am not familiar with gold rated, are you talking 5% tolerance instead of 10%? (By a GOLD color band?)

> Oh - any suggestions for a decent web places to order the small parts
> from?

Digikey
Mouser Electronics are places to start.

Date: Wed, 02 Feb 2000 21:02:13 -0600
From: "Dr. Gerald N. Johnson, P.E." <geraldj@ames.net>
Subject: Re: [R-390] recap a R-392

Use 200 volt orange drops for the oiled papers, dipped silver micas for the micas. Don't use orange drops for the silver micas, they don't have a low inductance or a close a stability as silver mica.

You need too use the original or large power rating. Some circuits need 2 watts, some need only a quarter watt.

5% resistors start out closer to the nominal value. In carbon composition resistors they don't necessarily have better long term stability than 20% resistors. Film types will stick closer, probably, but in some RF circuits may act differently and definitely will act differently is planned to act as safety fuses.

No tubes, but decent capacitor collections at Mouser (www.mouser.com) and digi-Key (www.digikey.com). Mouser has no minimum order, digikey charges $5 for orders under $25. Both are ready to sell parts, not ask "what tubes?"

Date: Wed, 1 Mar 2000 11:18:37 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: [R-390] R-392 IF deck voltage/resistance measurement question

Hi - I measured all the voltages and resistances in my IF deck on my R392 to get a better idea of the condition before diving in and replacing components. Three things stand out:

V503 pin 7 reads 6.81K ohm instead of 10K ohm.

V505 pin 7 reads 1914 ohm instead of 8K ohm.

and, across the board, pins 5 and 6 on all stages read approximately 3.66K ohms instead of 1K ohm.

Other voltages and resistances are 'off' but usually by 10 or 20%, instead of the larger amounts above. One last exception is that many pins that are supposed to be 0 ohm are often .1 or .2 ohm - I assume this is not significant.

I believe I followed the test settings correctly.

I'm doing this to begin tracking two basic problems with the reciever: 1) bandwidth 2 and 4KC have extreme reduced gain and high noise, and 2)

the receiver has much more noise at 8kc than my 390-A does.

Any advice or suggestions about the validity of the readings would be much appreciated. Basically, I need to know where a change of 10% or 20% is actually significant in terms of receiver operation.

Date: Wed, 01 Mar 2000 11:47:58 -0600
From: "Dr. Gerald N. Johnson, P.E." <geraldj@ames.net>
Subject: Re: [R-390] R-392 IF deck voltage/resistance measurement question

Pins 5 and 6 are plate and screen. Their resistances to ground would vary according to the leakage of bypass capacitors and the power source that might or might not be attached. For them a better check would be the resistance to the +28 plate pin on the power connector.

Check to see that the bandwidth switch on the back part of the IF (across the back of the radio) turns with the side switch. Loss of gain I recall came from the coupler clamp breaking so the two parts of the band switch didn't turn together. Back at the right angle gears in the back corner of the radio. to replace it without major disassembly you need a two piece clamp. Not hard to make from a bar of 1/4" square stock with a little drilling and tapping.

The low voltage on the tubes causes them to have low gain and limited strong signal handling capability. That can add to the noise. 73, Jerry, K0CQ

Date: Wed, 29 Mar 2000 08:50:38 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: [R-390] R-392 end point adjustment

Sorry for what is probably a dumb question, but what section, paragraph, or page # of the repair manual is the description of the process to adjust the 10 turns <-> 1 MC on the R-392 PTO? I've looked a bunch of times, and can't seem to find it.

Date: Wed, 29 Mar 2000 08:19:59 -0600
From: pbigelow@us.ibm.com
Subject: Re: [R-390] R-392 end point adjustment

My R-392 manual (1961, not a copy) does not have the description of the procedure.

Date: Wed, 29 Mar 2000 08:23 -0800 (PST)
From: rlruszkowski@west.raytheon.com

Subject: [R-390] Doing end point adjustment on PTO's

You read well. You will not find it in there or in the R390/A manuals. The goal is ten turns and exactly 1 million cycles. If low to high adjustment does not work, do high to low. Pull the PTO out of the chassis so you can grab the coupler. Hang your favorite counter on the PTO. Roll the shaft to get 2,455,000 on the counter. Mark the coupler and case with a marker. Spool off ten turns and line up your mark. Read a new number near 3,455,000 but not exact or you would not be doing this. Adjust the end point to get closer. spool back ten turns if you are not at 2,455,000 Then do this adjustment from high to low. One end should set still while the other end changes. Erase your marks. Roll the shaft to get 2,455,000 on the counter. Mark the coupler and case with a marker. Spool off ten turns and line up your mark. Read a new number near 3,455,000 but not exact or you would not be doing this. Adjust the end point to get closer. Spool back ten turns you should be close. About 3 or 4 times and you can get a 1,000,000 change in exactly ten turns. with a good counter you can get within 20 hertz. I have hit 2 or 3 hertz doing these on the bench in service. You can stop along the way at one turn points and track your 100,000 cal points. This will give you a clue to the linearity. You may record these for reference.

Date: Wed, 29 Mar 2000 13:34:14 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] Doing end point adjustment on PTO's

Roger - that is a great summary! The key question I have is how do I actually adjust the end point? What pot, slug, trimmer, am I supposed to be tweaking? The only obviously adjustable thing is the top of the transformer on the PTO - is that was I want to turn? The PTO I'm looking at is a Collins PTO for a R-392 (so it is different than the 390 and 390-A, I think). Over lunch, I went home and aligned the PTO shaft using my new RF signal generator (URM-25F), as well as the internal calibration crystal, and I think the end points are actually ok. There is some non-linearity over the whole range - maybe +/- 1.5 KC, but this is livable for me. I'm learning more (and enjoying it a lot)... thanks for writing, folks!

Date: Wed, 29 Mar 2000 13:33:28 -0600
From: "Bill Hawkins" <bill@iaxs.net>
Subject: RE: [R-390] Doing end point adjustment on PTO's

Were you using a mechanical 10 turn stop when you did this?

Twenty Hz in 1,000,000 in 10 turns is 20 in 100,000 for one turn or 1 in 5000, which is a little less than 1/10th of one degree mechanical rotation. If you drew a circle ten inches in diameter and used a pointer 5

inches long attached to the PTO coupler, you'd have to line the pointer up within 1/200 of an inch, or about 1/4 of 1/64 inch. I'd need a really steady hand and a magnifying glass, or maybe a microscope.

What I did was to fasten the PTO to the bench, on top of a steel panel, and then bring a try-square up against the coupling ridges. You're not looking for absolute accuracy of the endpoints, but to get 1 MHz in exactly ten turns. So you line up the coupling at the low end and write down the counter reading, turn the coupling ten turns, line it up with the try-square to get exactly 10 turns, adjust it, go back ten turns, do it over again until you can't get any better. Then you set either endpoint mechanically when you put the PTO back in the set, by moving the RF deck coupling on its shaft AFTER the set has thoroughly warmed up. Even an R-392 warms up, with its sealed case.

The ones I've done do not stay put at one end when the other is adjusted. That's why you do it several times. For an R-389 PTO it's 50 turns out and 50 turns back.

For a really good time, open up the PTO and use the corrector stack to improve the linearity. But don't open it if the air is humid. Minnesota in January is OK, when the dewpoint is well below freezing.

Date: Wed, 29 Mar 2000 12:21 -0800 (PST)
From: rlruszkowski@west.raytheon.com
Subject: [R-390] Locating the end point adjustment on PTO's

>Roger - The key question I have is how do I actually adjust the end point? >What pot, slug, trimmer, am I supposed to be tweaking? The only obviously >adjustable thing is the top of the transformer on the PTO - is that was I want to >turn? The PTO I'm looking at is a collins PTO for a R-392 (so it is different than >the 390 and 390-A, I think).

Ops I forgot to mention, there are several flavors.

Collins. You are looking for a 3/8 or 7/16 screw cover cap behind the tube that covers the adjustment point. This cap looks like a big bolt top.

Cosmos. You have two covers. Behind one is a single adjustment, This one you want for the end point. Behind the other the adjustments will change as you turn the PTO shaft. DO not adjust those if you are not working on the linearity of the PTO.

You can do a end to end spread check real quick. Zero the cal at one end. Spin the ten turns to the other end and see where the zero is. 2Kc is field acceptable for mil use. There ain't no reason to get yours adjusted down

under a 100 hertz. You can get that close with the cal oscillator and just taking the time. You run the KC know by hand and the PTO by hand and listen to the zero beat.

Once you get the span correct you reassemble the PTO and set the shaft adjustment to go with the dial counter, cal xtal and zero beat.

>The only obviously adjustable thing is the top of the transformer on the PTO - >is that was I want to turn?

You need a good RF meter or a scope or time to adjust the transformer on the PTO. Measure the PTO output. Adjust the transformer to give a best flat output level across the whole range of the PTO.

The PTO I'm looking at is a Collins PTO for a R-392 (so it is different than the 390 and 390-A, I think).

Only in some of the external mechanical forms. IE their not swapable off the shelf. But from the maintenance point of view they are equal.

You know tires come in all shapes and sizes these days. But the guy at the tire
shop gets them all on and off the rims the same way. So it is with the R3xx
family of PTO's If you have studied one you can do them all.

Date: Wed, 29 Mar 2000 13:13 -0800 (PST)
From: rlruszkowski@west.raytheon.com
Subject: Re:RE: [R-390] Doing end point adjustment on PTO's

We were in service and had nothing else to do for the whole damn shift. So we played with things a lot. Once we got done with the adjustment we put them back in the receiver and did the mechanical alignment. You can roll from 000 to +000 and get a good repeatable results. We just used a felt pen marker and some care. Random shots in several thousand receiver alignment over 6 years and your amazed a few fell almost exact. Roger

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Date: Wed, 29 Mar 2000 13:22 -0800 (PST)
From: rlruszkowski@west.raytheon.com
Subject: [R-390] More Doing end point adjustment on PTO's

>The ones I've done do not stay put at one end when the other is adjusted

This is true. However as you do the adjustments, it seemed to work better from one end to the other. After 25 years I do not remember which end would set more still than the other end. I only found a few in six years

that needing adjustment would not adjust. The depot said most of the ones we turned in were OK. We had just not let them warm up enough. Yea, like we believed that. The ones we did get from depot were real close in the span and we did not try to get them any better.

Date: Sun, 6 Aug 2000 00:45:32 EDT
From: W8JOE@aol.com
Subject: [R-390] Need advice on getting a R-392 in shape

Hello: I bought a R-392 a while back. I just got the power supply hooked up to it. Right now, the most obvious thing is that it receives rather poorly. It gets the stronger stations, but it is like the signal is attenuated. In addition, when you turn the various controls, such as AF Gain and RF Gain, AGC, you get a burst of static, as if the pots were dirty. What would you guys recommend that I do to it to see if it can be made to receive a little better. Give it a bath? Clean the switches with some form of contact cleaner? It is not in the best physical shape, and what I wanted to use it for was out in the barn for listening to the guys on 3.885.

Date: Sun, 06 Aug 2000 00:34:01 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Need advice on getting a R-392 in shape

Clean the pots carefully with Deoxit from Cramolin. Don't wash down the radio indiscriminately, that can make it worse. Make sure the gear clamps on the band switch shaft (goes down the right side and across the back) aren't broken. The sensitivity really falls if half the IF is at one bandwidth setting and the other half is at another.

Feed the plates 32 volts and the heaters 28. Apply a tiny drop of Deoxit to each switch contact. Don't soak the switch wafers. Its a waste and can lead to further losses. Then you may need some tubes, they aren't invincible.

Date: Sun, 6 Aug 2000 08:32:40 -0400
From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [MilSurplus] [R-390] Need advice on getting a R-392 in shape

The 24 and 28 volts "equivalent" -- nominally. That's the difference between engine-off and engine running for a typical 24 volt truck electrical system. The battery is 24 volts -- somewhat higher for a while if fully charged, but the system runs at 27.6 or so when the engine and its generator/alternator are running. In most cases, "engine on" would be the situation, especially if the transmitter were in use.

I run my R-392's from voltage regulated variable supplies. I have noticed

a
difference between 24 and 28, but tend to compromise at 26. I read that the best of both worlds is 24 for the filaments and 28 for the B+ (I think this is on Josh Rovero's site.) The lower filament voltage is supposed to be better for tube life. There are separate pins for the filaments and B+ on the power socket. Caig is the manufacturer of DeOxit. Also Cailube MCL for controls.

Date: Sun, 6 Aug 2000 08:41:25 -0400
From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] Need advice on getting a R-392 in shape

Dr. Gerald N. Johnson wrote:

> snipped< Feed the plates 32 volts and the heaters 28. Apply a tiny drop of >Deoxit to each switch contact.<

Sounds high to me, Jerry. I thought the optimum was 28 and 24 respectively, the idea being to get the filaments down to rated voltage rather than what the typical 24v truck system dishes out when the engine's running (~27.6).

Date: Sun, 6 Aug 2000 09:11:46 EDT
From: W8JOE@aol.com
Subject: [R-390] Questions about what happens when a R-392 is refubished by the army

When a radio is contracted out to be refurbished by a civilian contractor, what happens? Say to a R-390 or R-392? Do they repaint the face of the radio? Do they put a new tag on it?

Date: Sun, 06 Aug 2000 08:29:06 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Need advice on getting a R-392 in shape

28v and 32v were the recommended values in an article in 73 magazine about July 1974. A number of the tubes have nominal ratings of 26 so 24 might be on their low side. They are designed to be run from a 12 cell lead acid battery while being charged or not being charged. Would that charging voltage would be so precise as 27.6. SAE standards would allow charging voltages from 24 to 32. 28.4 would be optimum for battery life and capacity. There will some voltage drop when the companion T-195 is keyed drawing up to 30 amps running (more to start the dynamotors if not updated to the solid state inverters). The gain of tubes is fairly sensitive to plate (and screen) voltage when the voltage is so low. A little increase has a significant effect on gain and dynamic range. There are a

gaggle of IF stages because the gain per stage is low. Look at the data for the 6AJ5.

Date: Sun, 6 Aug 2000 16:09:56 EDT
From: W8JOE@aol.com
Subject: [R-390] Ventilate a R-392?

Do people who use a R-392 at their home station and leave it on for long periods usually ventilate it somehow? Like drilling holes in the case or removing it from the case a little. I would imagine that it would get hot in there.

Date: Sun, 6 Aug 2000 17:28:06 -0400
From: "Barry Hauser" <barry@hausernet.com>
Subject: [R-390] Re: [MilSurplus] Ventilate a R-392?

I agree with the others -- don't drill it! That'll void the warranty and it's probably a violation of the Geneva Radio Convention or somethin'. If you are going to run it for long periods, no harm in scootching it out of the case a half inch or so. But the reason most of these are so clean inside is that they're sealed and immersion proof. No dust, no bugs, no varmints, etc. Also a great feature in case of flood and it's one boatanchor you could use for a boat anchor and still play it later. (although I don't know how many fathoms it's good for). One advantage to keeping it open a crack is the aroma therapy. Unless that lets the genie out of the bottle?

Date: Sun, 6 Aug 2000 21:39:38 -0400 (EDT)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] Ventilate a R-392?

I'm still fairly new to these radios, but after having looked at 2 R-392's in detail, and 4 or 5 390, 391, and 390A radios in detail, I have to say that for heat related problems nothing seems to beat the rectifier tubes on the 390, 391, and 390-A as well as the B+ regulator circuits on the 390 and 391 AF deck. The 392 just doesn't seem to have anything that actually chars components, although i certainly could be wrong.

You could put the solid state 27A7-GT replacement in and prevent some heat buildup - I think that is the largest single source of power consumption in there. Rovero's home page eventually leads to some detailed discussion of power saving suggestions, which I find interesting, but I won't personally do, as I've got more basic problems to deal with first.

Date: Sun, 6 Aug 2000 21:13:47 -0500
From: "Robert Nickels" <ranickel@mwci.net>

Subject: Re: [R-390] Ventilate a R-392?

>You could put the solid state 27A7-GT replacement in and prevent some heat buildup - I think that is the largest single source of power consumption
>in there.

Agreed. Has anyone got the schematic for the solid-state audio module that was used in the R-392? Shouldn't be too hard to brew one up using an octal relay housing or such...

Date: Sun, 06 Aug 2000 22:05:17 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Ventilate a R-392?

Wasn't it in the TM? Took a couple transformers and some germanium power transistors. Probably would be far easier to regulate half an amp or so of the 28 volts down to 12 volts and use something like a LM383 or LM386 or some other 12 volt power amplifier chip. Maybe there are some stereo power chips ready to use an unbalanced 28 volt supply and not needing transformers. I've not surveyed that area lately, but I do have several tons of data books accumulated over the past 30 years.

Date: Sun, 06 Aug 2000 21:54:22 -0700
From: Robert Tetrault <tetrault@teleport.com>
Subject: Re: [R-390] Ventilate a R-392?

National makes audio power amps that will accept 40 Volts, and certainly 28 therefore, looks like a TO-220 with five or more pins. Made for the automotive market. Should be on their Web site. Unbalanced, need a biggish electrolytic on the output...Set the gain with a couple of resistors, like an opamp.

Date: Mon, 07 Aug 2000 00:55:05 -0500
From: "Marshall M. Dues" <mmdues@hal-pc.org>
Subject: [R-390] R-392 Solid State Audio Module

I found a nice schematic of the solid state audio module for the R-392, complete with a description of the circuit in the Field and Depot Maintenance Manual for Departments of the Army and the Air Force dated 21 August 1961. Ref. Department of the Army Technical Manual TM-11-5820-334-35, and Department of the Air Force Technical Manual TO 31R1-2URR-422, pages 37, (fig. 20. Audio Module schematic diagram.), and page 36, part 26 (circuit description) as follows:

Note: An audio module is used in place of V608 in certain receivers. The

theory in this paragraph applies to receivers using an audio module.

The audio module is a transistorized plug-in unit designed to directly replace second AF amplifier tube V608. The maximum audio output of the audio module is 1 watt with less than 7.5 percent distortion when operated with a 28-volt DC supply voltage.

a. When an audio module is used in place of V608, V607 acts as a cathode follower. The output signal taken across cathode resistor R628 is coupled by capacitor C627 to the base of transistor Q601 of the audio module.
b. Emitter follower Q601 matches the impedance between V607 and amplifier Q602. The audio input signal is coupled from the cathode of cathode follower V607, through pin 3 of the socket to the base of Q601. The +28 volts is applied to the collector of Q601 from pin 5 of the module socket. Resistors R643 and R644 make up a divider which provides the proper base bias for Q601. Resistor R645 is the load resistor for Q601. The output of Q601 is applied to the base of Q602. The audio output of Q602 is transformer coupled by T604 to the bases of the push-pull power output stage which consists of transistors Q603 and Q604. Capacitor C638 reduces the higher frequency response of T604.

c. The +28 volts is applied from pin 6 of the audio module socket through the primary of T605 to the collectors of Q603 and Q604. Resistors R647 and R648 establish the proper base bias. Resistors R650 and R651 are in the emitter circuits to compensate for temperature variations. Resistor R649 provides a negative feedback current to Q602 for improved amplifier gain stability and frequency response. The output signal from the collectors of Q603 and Q604 is transformer coupled through transformer T605 and applied directly through pin connections 4 and 8 of the audio module base to the primary winding of transformer T603.

(end of circuit description for audio module)

I can have a copy of the schematic for the transistorized audio module made and mail it to you if you like. Sorry, I don't have means to scan any graphics at home, yet, otherwise I could send you the pertinent pictures.

I have 2 working R-392s and 2 mostly complete parts units less cabinets as well as a nice working Collins R-390A....Great radios, all.

Marshall M. Dues, WB5MYO
Katy, Texas
Republic of Bubba

Date: Mon, 07 Aug 2000 08:08:13 -0400
From: "Wm. L. Townsend" <wlt@tesnet.com>
Subject: Re: [R-390] Re: [MilSurplus] Ventilate a R-392?

I don't think an R392 is going to make a very good anchor unless you drill some vent holes.

From measurements on my Stewart Warner R392, I estimate the case to be 0.91 cubic foot (approx. 11x11x13 inches). My UPS scale says it's 52 pounds. At 62.4 lb/cu ft for fresh water the R392 ought to displace 56.8 pounds of water giving it a little under 5 pounds of buoyancy. In salt water at 64 lb/cu ft, it does a little better. I haven't actually tried this but it looks like an R392 would float.

Wouldn't make a great life preserver, but I guess if you had enough of them you could strap them together and make a raft or something...

Seriously though, I've run mine for weeks at a time and never had any problems with heat. The case gets pretty warm but it probably got a lot warmer sitting in the sun on a truck. I suppose they didn't typically run for more than a few hours at a time in the field. Maybe somebody who used the R392 in the field can comment about that.

Date: Mon, 7 Aug 2000 08:19:26 -0400
From: "Ronald Reams" <wa4mjf@worldnet.att.net>
Subject: Re: [R-390] Re: [MilSurplus] Ventilate a R-392?

When used in a AN/GRC-46, VSC-3 etc ran 24/7. Cavalry scouts probably ran them not as much in the AN/GRC-19 config. Any cav/armor guys on???

Date: Mon, 7 Aug 2000 09:17:09 -0400
From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] Re: [MilSurplus] Ventilate a R-392?

Hmmmm.... There's a fairly safe way to test this. First, check all the seals and tighten up the panel bolts. Then, put the R-392 face up in your bathtub. Step 3 - fill the tub. Probably won't start to float until the water level gets up near the panel and before there's a risk of leakage through a worn out or shrunken control seal. (Watch for bubbles.) If the case wasn't too dirty, you can save the water for a bath. Could add some epsom salt to check the salt water performance. This may also be an option for heat buildup -- water cooled 392. Are LS-166/U's water proof also? Might be a great in-the-pool radio which you could hear under water.

What voltage(s) do you use? 24? 28? split fil/B+?

PS. Do you think the T-195 will float? guess not from what I've heard.

Date: Mon, 07 Aug 2000 09:28:39 -0400
From: Bill Cotter <bcotter@pop.uky.edu>
Subject: Re: [R-390] Ventilate a R-392?

The circuit you describe sounds like the factory AF module that are somewhat scarce. There is a published mod for the '392 in a CQ of the 70's that used a pair of darlington connected TO-220 transistors and two resistors. This was built on an old octal socket. The previous owner of the '392 I have did this mod. It sounds OK, though the distortion is a bit high. He also replaced three tubes with germanium diodes, also described in the article. I'll go back and dig for the article and announce the date of issue.

Date: Mon, 07 Aug 2000 09:48:40 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Ventilate a R-392?

The modern IC is designed to drive a speaker directly, not through a transformer for full power but ought to get at least as much power as a tube while driving only one side of the output transformer. The IC has a near zero output impedance, is nearly a perfect voltage source so will supply maximum power to the transformer.

Date: Mon, 07 Aug 2000 09:48:43 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Ventilate a R-392?

I remember the optional solid state module from the TM that I had with the 392 when I had a MARS 392 (and T-195). I didn't have one. It should have needed some 80 volt power transistors to fit in place of the tube. I don't remember that the tube was really great on distortion. Its hard to get the tube to draw enough plate current at that plate voltage to be super linear.

Low threshold schotky diodes would probably be better than germanium diodes.

The only article I remember in the 70s was in ham radio, July 1974, I think. Should be in some 390 archive page right next to an article on the 390 from the same magazine issue.

Date: Mon, 07 Aug 2000 09:48:51 -0500
From: "Dr. Gerald N. Johnson" <geraldj@ames.net>
Subject: Re: [R-390] Ventilate a R-392?

Looks like those are early SILICON transistors.

There is a hazard replacing the 26A6 with 40673. There is more gain in one 40673 than four 26A6. Which if the 40673 is biased normally for maximum gain can lead to overload and oscillation problems. Running the second gate at probably 1/4 its normal voltage may calm them adequately and still have good gate 1 AGC control range.

Date: Fri, 18 Aug 2000 07:27:46 EDT
From: W8JOE@aol.com
Subject: [R-390] Question on R-392 and on serial numbers

Hello: Got the cans of Deoxit in the mail and took apart the R-392 and sprayed the switches and took out the tubes and sprayed into the sockets. When I turned on the rig it had really improved. Although while some of the bands work really well, it seems to be very weak on receive on the 3.000 band. Any ideas would be appreciated. By the way, the rig has on its serial number plate,. which is a Philadelphia 1952 contract an addition of "R-1" that was stamped next to the serial number. The front of the rig has a military stamp of 4-63, and on the inside of the rig it has bright orange painted "x's" and on one place has stamped "Mod no. 2." Was the rig reworked at a depo?

Date: Fri, 18 Aug 2000 19:20:15 EDT
From: W8JOE@aol.com
Subject: [R-390] Question on crystals going bad

Hello: I am working on why my 3 band is dead on my R-392. Some suggested a bad crystal. When I put out a signal on my transmitter, I hear the tone and hear the transmit of my AM signal. As a result of this, would the crystal be bad or "weak" so I could not hear less strong signals on it?

Date: Sat, 19 Aug 2000 08:07:58 -0700
From: Leo Jormanainen <lexa@mail.island.net>
Subject: [R-390] R-392/URR Solid State Audio

I have a R-392 Stromberg-Carlson Ser. No. 5387 R It was working fine until, I installed a military issue solid state audio module into it. It has too much gain, feedback. At first I put a .01mfd 50V ceramic cap on pin 5 and a 47mfd 200V electrolytic and .01 mfd 50V ceramic cap on pin 6 on the socket V608. With that setup I was able to crack the volume a bit and listen to a station. After some trial and error I now have nothing on pin 5 and a 150 mfd 200V electrolytic capacitor on pin 6. Now the receiver has good fidelity and volume, but I can't turn the volume up any more then 1/2" before it goes into feedback and lets out a howl. Does anyone have a suggestion?

Date: Sat, 19 Aug 2000 12:00:35 -0400

From: "Ronald Reams" <wa4mjf@worldnet.att.net>
Subject: Re: [R-390] R-392/URR Solid State Audio

I remmeber that when FR had the surplus SS (SMC-356720) modules for sale.

Date: Sat, 19 Aug 2000 10:40:34 -0700
From: Leo Jormanainen <lexa@mail.island.net>
Subject: Re: [R-390] R-392/URR Solid State Audio

I got the R-392 and the module from FR, they sent me a schematic for the mods with the module. It was to put a 20-50 mfd cap and a .01 mfd cap on pin 6. Also a .01 mfd cap on pin 5. As it turned out, if I put anything on pin 5, things got worse. I was thinking on adding another resistor with R629 in parallel. I thought it would be better to ask the guru's for suggestions first. I'm a rookie.

Date: Sat, 19 Aug 2000 23:59:27 EDT
From: W8JOE@aol.com
Subject: [R-390] R-392 problems

Hello: I have been working on the R-392. Looking at the troubleshooting chart in the manual (Field and Depot Maintenance Manual), on the trouble shooting chart, I think that my radio has the problem described as: "Receiver normal on 8 - to 32-mc bands but inoperative on).5 - to 8-mc bands. " The probable trouble is stated as: "Defective 1st mixer or 1st crystal oscillator stage"

The procedure is to "Check 1st mixer by voltage and resistance measurements (fig. 78). and Check 1st crystal oscillator by voltage and resistance measurements (fig. 78).

I haven't checked out the measurements yet, when I have a strong signal from my transmitter in the area, the radio receives that, although nothing else, and nothing from a signal generator pumped directly into the antenna connector. And, the broadcast band does work fairly well, not real well, but sort of OK. Any suggestions or ideas? The bands above 8 mc do work well.

Date: Sun, 03 Sep 2000 10:42:11 -0300
From: Guido Santacana <laffitte@prtc.net>
Subject: [R-390] R392 noise

I hope that everyone is having a swell Labor Day Weekend. My Stromberg Carlson R392 (bought as a checked unit from Fair three years ago) has developed a peculiar hash that you can hear even with the AF gain

completely out. It is heard usually after the unit heats up but now I can even hear it when I turn on. Audio and sensitivity are not affected by the noise. Anyone with a similar experience and possible cause before I start my search?

Date: Sun, 03 Sep 2000 09:45:34 -0500
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: [R-390] R392 noise

Since you hear it with the audio gain control turned down, its after that point in the radio. About the only thing I can think of that would produce noise before the tubes heat (so long as it doesn't have a solid state audio output module) is some bypass capacitor from plate to ground (tone control capacitor), maybe a leaky B+ bypass capacitor or noise coming from the 28 volt power supply.

Date: Sun, 03 Sep 2000 09:45:46 -0500
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: [R-390] Crackling audio when the BFO is ON

The crackling has to come from the BFO or the detector. That's all that is changed when the BFO is turned on. Check the two circuits by swapping tubes. Tubes have sockets because they don't last as long as most of the other components. Crackling can come from leaky capacitors, bad solder joints, faulty resistors, broken connections in oscillator coils. The BFO creates DC in the detector circuit and that DC can lead to noise in the audio from leaky coupling capacitors or bypass capacitors.

Date: Sun, 03 Sep 2000 10:59:22 -0500
From: Tom Norris <badger@telalink.net>
Subject: Fwd: Re: [R-390] R392 noise

Also check the caps feeding the grid of the output tube, as they are 0.1mf, and COULD be leaky, also check the largish electrolytic C624 that bypasses the screen supply that feeds the audio stages. Actually any electrolytic cap under that AF/IF board would be suspect to me after all these years. Not just suspect in the problem you are having, but just in general.

Date: Sun, 03 Sep 2000 10:28:22 -0500
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: Fwd: Re: [R-390] R392 noise

Those are parts that I'd shotgun without checking. Output tubes are too rare to trust them to leaky coupling capacitors. But since the noise shows up before the tubes heat, the grid coupling capacitors don't seem to be part

of the problem. That screen bypass could insert noise most any time.

Date: Sun, 3 Sep 2000 13:37:52 -0400
From: "Walter Wilson" <wewilson@knology.net>
Subject: Re: [R-390] Crackling audio when the BFO is ON

Since the problem did not disappear when I swapped in a known "quiet" IF deck from another radio (same for AF and P/S decks), I guess I need to start looking at the wiring and solder joints external to these decks. In other words, on the chassis. Agreed?

Date: Sun, 03 Sep 2000 11:46:46 -0500
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: [R-390] Crackling audio when the BFO is ON

BFO

Date: Sun, 3 Sep 2000 13:44:56 -0400 (EDT)
From: Norman Ryan <nryan@duke.edu>
Subject: Re: [R-390] Crackling audio when the BFO is ON

Have you dropped the front panel to have a good look at the BFO and FUNCTION switches? S-W IF deck is most suspicious because it has the BFO coil, but you say that deck works fine in your Collins, right? If so, fault may be in either of those two switches' contacts or the wiring harness. If you can get the radio to work with the front panel swung down, try working the contacts and/or harness. Be careful around the voltages present (115 VAC), and be sure to support the receiver on 2 x 4 blocks to take the strain off the harness wiring.

While poking around in the harness, look for chafed wiring, I've had to tape wires and relace cables that were damaged due to careless handling when set is out of the rack.

Date: Sun, 3 Sep 2000 14:30:09 -0400
From: "Walter Wilson" <wewilson@knology.net>
Subject: Re: [R-390] Crackling audio when the BFO is ON

Thanks for the help. The problem is gone now. I sprayed another dose of DeOxit on the BFO switch and resoldered the two wires, but no luck. So I took apart the multipin connection to the IF deck and desoldered/resoldered all the connections. MUCH better. Thanks.

Date: Tue, 17 Oct 2000 13:06:35 -0500
From: "David Wendt" <dwendt@electrocam.com>
Subject: Re: [R-390] 26C6 Tube

All of the 26 volt tubes in the R-392 are rather unique and do not have substitutions except for the 26A6. It can be replaced with the 26FZ6 which is even more rare. The 26C6 seems to be the hardest one to find these days too. Once and a while one will show up in a group of tubes at that auction place. When browsing around I have seen some of the tube vendors have it listed, but have no immediate answer as to who or where.

A question for all on these 26 volt tubes. Is RCA the only company that produced them? They were the original developers. I have not gone through all of my 392's but I only seem to recall ever seeing RCA brand tubes. It seems strange that with probably over 20 years of procurement they would have been the only contractor. Maybe I just have not looked hard enough.

Date: Sun, 12 Nov 2000 10:51:09 -0600
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: [R-390] R-392 Strangeness

The most common shorts are heater to cathode. That might actually increase the gain by overcoming cathode bias used for manual RF gain control. And like its been noted, there isn't a whole lot of gain per stage in the '392 IF strip, so missing one or two might not affect short wave broadcast stations. While you are digging in, check the clamps on the right angle gears for the IF selectivity switch. When either of them breaks, the receiver performance goes down except on the last bandwidth it was used on before the clamp gave way.

Date: Sun, 12 Nov 2000 13:18:46 -0500
From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] R-392 Strangeness

Well, I checked the remaining tubes. The 26A6's (2) on the RF deck were good, but the 26C6's were both very weak on all three readings. No spares, so I put 'em back. The two tubes on the back were good. Powering up after all that, the '392 seems to work well - didn't notice much. Naturally, the BFO works now that it has a tube with enough gain to oscillate. I did have another R-392 that arrived DOA. That was a shorted 26A6 in the RF deck as I recall. This radio, BTW has all black tube shields with the corrugated heat sink inserts (not five-sided flat or "magic fingers"). They're regular bayonet mount with springs, mostly Elco and Collins. First time I've seen a '392 so equipped. Usually they have the shiny bayonet/spring shields. Can 26A6's or 26C6's be "rejuvenated"?

Date: Sun, 17 Dec 2000 16:27:12 -0500
From: "Wm. L. Townsend" <wlt@tesnet.com>

Subject: [R-390] R-392 Audio Module

Fair Radio recently had a few of the solid state modules to replace the 26A7 audio output tube in the R-392. Their as said 'seems to work best in Western Electric made R-392s' and I've seen some other comments about how these modules don't work very well in most R-392s and the audio section tends to oscillate when you use one. Mine is from Stewart Warner but I thought I'd try it anyway since 26A7s don't seem to be all that common.

After fooling around with it most of this morning I found the following:

1. In my 392 the audio module worked, but only if the AF gain was kept almost completely off. At anything other than about 5-10% rotation the audio section breaks into a really nasty (and LOUD!) oscillation at about 2kc.

2. The extention cable for the IF strip in an R-392A looks like it ought to work for the R-392 audio/IF/calibrator deck. This is only partially true. It will work, but the shielded cables are on the wrong pins so it doesn't really work very well. Also, the BFO on my receiver didn't work when the extention cable was in. I guess I should have checked the schematic first - doesn't seem to have hurt anything though.

3. Adding additional bypass capacitors around the 28v going into the audio module didn't make any difference.

4. The oscillation disappeared completely after I lifted one end of R629. This resistor is between the audio output transformer and the top of the AF gain control to provide negative feedback around the original audio circuit. According to the manual this was intended to reduce distortion.

The receiver has been running all afternoon with no problems, so it looks like maybe this is the trick, at least for the Stewart-Warner radios.

I don't notice any particular difference in the audio quality vs the 26A7 other than there's a lot more audio with the solid state module. I can't hear any difference in quality at levels similar to what I used to run with the tube. The power supply runs cooler, too...

Has anybody else managed to get one of these to work in an R-392?

I'd also be interested to know what difference, if any, there was in the Western Electric units. Something must have been different if these modules worked in them. None of my documentation mentions any changes to be made when using one of these modules. Does anybody have

any experience swapping the lower deck assembly in 392s? I've never had problems with module swapping in 390As, but have never tried it with the 392.

Date: Sun, 17 Dec 2000 19:08:51 -0600
From: "Bill Hawkins" <bill@iaxs.net>
Subject: RE: [R-390] R-392 Audio Module

Each time a stage of gain is used, the phase of the audio signal changes 180 degrees. If the SS module has one more stage of gain than the tube it replaces, the negative feedback becomes positive feedback. And it probably does have a second stage to drive the power transistor. Just a guess, haven't looked at a schematic, etc. Try to reverse the phase of the feedback, possibly by swapping transformer leads.

Date: Sun, 17 Dec 2000 19:39:50 -0800
From: "Dave Campbell" <wcampbell@odyssey.on.ca>
Subject: [R-390] R-392 moisture

After being on for few hours the dial glass steams up to a point where I can't read the dial. I've removed the glass and left the radio on for a few days, hoping to cook any moisture out. Replaced the glass after checking the seal. I also beefed up the main seal with weather strip. No difference, just as bad. Has anyone had this problem and could offer suggestions?

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Date: Mon, 18 Dec 2000 08:00:25 -0800
From: eengineer <eengineer@erols.com>
Subject: Re: [R-390] R-392 moisture

Remove the R392 case and run it a while. Some photographic desiccant may help. Here at home the air is dry in the wintertime from the heat system. I use humidifiers to put moisture back in the house. If you house is dry, leave the case off for several days. Very LOW wattage forced air may also help. when it finialy dries out, repack \ it with desiccant.

Date: Mon, 18 Dec 2000 08:36:24 -0500
From: "Wm. L. Townsend" <wlt@tesnet.com>
Subject: Re: [R-390] R-392 Audio Module

Yeah, I looked at that. The transistor thing does have one more non-inverting stage which is kind of suspicious, but it also adds two more transformers, so I was assuming (probably incorrectly) that whoever designed the thing had used the transformers to get the phase back where it needed to be for it to work in the existing circuit.

The bottom 1.5 inches or so is potted with the transformers inside. The

wires from the pins on the octal base and the wires from the transformers stick out the top of the epoxy and the rest of the circuit is on a heat sink above the potting compound. No information on which wire is which. I suppose it might be interesting to go back and play around with it a little more, but I was getting pretty fed up with it by the time I finally got it working! Since apparently several people that have tried these things have had a similar problem it looks like either all of them were perhaps built wrong, or there was a modification of some kind to the radio. The radio mod seems more likely but none of the documentation I have talks about any changes.

Date: Mon, 18 Dec 2000 08:51:30 -0500
From: "Wm. L. Townsend" <wlt@tesnet.com>
Subject: Re: [R-390] R-392 moisture

I've never seen a problem like that, even in the R-392 I used for the 'float' test a couple of months ago. Are you sure it's water? Maybe it's something else cooking out of a component somewhere... If it really is water you could maybe throw a couple of desiccant bags (like are sometimes packed in new computers, cameras, vcrs, etc.) inside and let it set for a week. You could then remove the desiccant and it ought to be OK.

Date: Mon, 18 Dec 2000 09:16:12 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] R-392 moisture

Something just occured to me - once when I opened something that was supposed to be sealed, water came out. I think it was a crusty VFO. Maybe there is a component/can/case inside that is actually holding water. Mind you, this was on a 390A, which was exposed to the weather. 392's can be, too, if the meter was taken out.

Date: Mon, 18 Dec 2000 09:16:42 -0500
From: "Phil (VA3UX)" <phil@vaxxine.com>
Subject: Re: [R-390] R-392 moisture

I wouldn't be afraid to heat it up a bit with a hair dryer or something similar. When restoring/re-conditioning an instrument for a customer, Tektronix would wash the entire instrument with de-ionized water and detergent. The entire thing would be sprayed (medium pressure) inside and out and then rinsed. Then it would be placed in a drying oven for 48 hours at around 110 to 120 degrees F. Then the electrical restoration would be begin. Since this works well for a instrument that's been totally drenched, aiming a hair dryer at various parts of your radio chassis for an hour here and there should work just fine. Probably running it for a few days with the cover off will get the job done.

Date: Mon, 18 Dec 2000 07:13:32 -0800
From: Leo Jormanainen <lexa@mail.island.net>
Subject: Re: [R-390] R-392 Audio Module

I have a Stromberg-Carlson R-392/URR that I installed a SS module into. I battled with different combinations of caps and the result was feedback every time. My last experiment was a .47mf electrolytic on pin 6 to ground and a .22 cap from pin 1 to ground. That improved the audio so I could turn it up almost halfway before it started to howl. I was using a Hammond 119DA line-transformer to a Rat-Shack Pro7 speaker. My problem turned out to be a impedence mismatch. I removed the line-transformer and went directly to the 8ohm speaker. Now the set works great, good fidelity, no distortion and good volume. Go figure!

Date: 18 Dec 00 08:07:52 -0700
From: "Richard McClung" <richard_mcclung@tcibr.com>
Subject: Re: [R-390] R-392 moisture

While working in an Electronic Maintenance Facility for a Special Forces Group I had many occasions for removing moisture from the interior of communications equipment. A lot of effort was expended in flushing out sea
(salt) water with fresh water (we didn't have any water deionizer capability). I would use a deep sink and used the normal water pressure from the tap to rinse out the chassis and modules. I would then place the equipment on a table with flood lamps to dry for 24 hours. I would next use low air pressure to blow any remaining water out of the equipment and place under the lamps for another 24 hours. After this the equipment would be inspected/reassembled using the ACRONYM FITCAL (Feel, Inspect, Tighten, Calibrate, Adjust, and Lubricate) and ran through a final inspection/test to verify operation per the appropriate TM/DMWR.....Some cases of water removal required the use of denatured alcohol to help disperse the water.....

I would also recharge the desiccant crystals by spreading them out on a cookie sheet. Place the cookie sheet in an oven set to 350 degrees F and bake until the dark color changed to a very light pink or rose shade. Then cool and recharge the desiccators.
Date: Mon, 18 Dec 2000 12:06:55 -0600
From: "Bill Hawkins" <bill@iaxs.net>
Subject: RE: [R-390] R-392 moisture

All 'sealed' systems, except hermetically sealed, have a problem with 'breathing'. At an oil refinery in Houston, the sun bakes exposed runs of conduit and boxes containing instruments. The air inside expands with

temperature but the volume doesn't, so the pressure goes up and air manages to leak out. Then a thunderstorm hits and everything is rapidly cooled. The internal air pressure drops below atmospheric, and the case breathes in, inhaling water with it. Old rubber seals, especially around shafts, can leak air. A guy down in Puerto Rico had the same problem with a steamy window. If it really bothers you, heat the window with a hair dryer while you're operating.

But try to dry it out first. Or you could send it up here to Minneapolis. Our zero degree weather will dry out anything. And -20 (F) kills all forms of the cockroach.

Date: Mon, 18 Dec 2000 15:16:20 -0500
From: "John F. Bunting" <w4net@carneconn.com>
Subject: Re [R-390] R-392 moisture

I had this same experience with the R-392/URR made by Stromberg-Carlson that I received from Fair Radio this past September. It had been powered up
outside the cabinet for periods of 4 to 6 hours a number of times before I buttoned it up in it's case. After an all day run, it had condensation on the inside of the dial window. I took the window off and let it cook for another 4 hours and then put the window back in while it was good and warm. Next day after an 8 hour run, there was moisture on the window again. I had a tank of air (a 25 # Freon Cylinder) and blew it into the radio through hole below the dial window after opening the dial window again. Let it run that way for 4 more hours and closed up the window, but let it run overnight with the plug below the window still out. The next morning I put the plug back in and put a little silicone grease on the "O" ring and tightened it up. Turned the radio off and left it cooling overnight. Next morning, started it up and watched for moisture on the inside of the window. None has showed up since. I guess my compressed air was pretty dry and it forced most of the moist air out and running it with the small plug out must have expelled the small amount of moisture that was remaining. I'm inclined to try to obtain some bags of desiccant, if I can find some for insurance against a repeat.

Date: Mon, 18 Dec 2000 17:33:20 -0600
From: "Dr. Gerald N. Johnson, electrical engineer" <geraldj@ames.net>
Subject: Re: Re [R-390] R-392 moisture

Desiccant is available from McMaster-Carr, or chemical supply places. If it gets wet dry the desiccant in an oven. Its sometimes called silica gel. There should be piles of packets of it in the store rooms of camera stores from unpacking packages. Maybe in consumer electronics stores too. It might be available at shipping places that ship to the tropics.

Date: Wed, 20 Dec 2000 20:33:48 -0500
From: "John F. Bunting" <w4net@carneconn.com>
Subject: Re: [R-390] R-392 Audio Module

I have read your posts with interest, as I have one of the S.S. Audio Modules on order from Fair Radio now. I have TM 11-5820-334-35, 21 August 1961. It Has a circuit description of the Audio Module on page 36 and has a schematic (Fig. 20) on page 37 which includes V607 (Phase Inverter, when V608, 26A7GT is used), and as a Cathode Follower driving Q601 when the Audio Module is used. It also shows the external output connections to and from T603 (Audio Output Transformer in the R-392). It also includes the complete schematic of the Audio Module. Reading through the circuit description, I noted that the module itself has internal negative feedback from the Q604's collector via R649, 47K to the emitter of Q602.

The external output connections do not include R629, 8.2 Meg to provide feedback to V606 (!st AF Amp.) such as used when the 26A7GT is used. Compare Figs. 18 and 19, pages 34 and 35. It is my belief that the WE Co R-392s that used the Module did not have R-629 equipped. Since the negative feedback loop is entirely internal to the Audio Module.

I have not seen any changes (updates) to this TM, so I do not know if a later note was added to the overall schematic to show that R629 was not used in those receivers equipped with Audio Modules.

There is a comment at the beginning of the circuit description that only certain receivers used the Audio Module. I have a 1952 contract Stromberg-Carlson made for Collins Radio and I'm looking forward to the increased audio and much less heat. I thank you for posting your solution to the problem. It has saved me a lot of work. I hope my supposition about the lack of need for R629 in this situation is correct.

Does the group think my supposition is reasonable ?

Date: Thu, 21 Dec 2000 11:24:13 -0500
From: "Wm. L. Townsend" <wlt@tesnet.com>
Subject: Re: [R-390] R-392 Audio Module

You're right, Fig. 20 doesn't show R629. I hadn't noticed that. Removing R629 certainly fixes the problem, at least on my unit, so maybe it was intentionally not shown in Fig.20.

> I have not seen any changes (updates) to this TM, ...

I've never seen any later documentation, either. Apparently the Western Electric contract was in 1963, so it seems like there ought to have been some kind of documentation update if they really changed the wiring...

> looking forward to the increased audio and much less heat. .....

It's working very nicely in my '52 Stewart-Warner. Please let us know it pulling R629 works in your radio.

Date: Sat, 23 Dec 2000 15:22:00 -0600
From: plmills@attglobal.net
Subject: [R-390] R392 circuit question?

Does anyone know the purpose of L232 and L233 in the filament circuits of the first and second mixers in the R-392. I have one that is open and am wondering what problems I might have by simply bypassing it.

Date: Fri, 23 Feb 2001 12:02:22 -0800
From: Leo Jormanainen <lexa@mail.island.net>
Subject: [R-390] R-392 AGC

I don't think the AGC is working on my Stromberg-Carlson R-392/URR. It doesn't make any difference to the reception if the AGC is on or off. When I turn the receiver on, the carrier level needle goes hard right, then settles to just left of center. It doesn't deflect in any direction, regardless of signal after it's on. Is there a easy way to troubleshoot this? I don't have a scope or frequency generator. Thanks.

Date: Wed, 14 Mar 2001 13:41:00 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: [R-390] need suggestions for finding shorts in B+

I've got an R-392 lower deck that has what I'm sure is a big ol' short from B+ to ground (pin 19 on the big plug goes through a 39 ohm resistor, then the B+ connects to the other side of the resistor, and at that point is zero ohms to ground). I've removed all connectors and tubes, so it isn't them. Since B+ runs through the whole deck, any suggestions for tracking it down?

My best guess is to find where B+ goes from the AF deck to the IF deck, and pull the wire there, to at least find out which side has the short. Is this, plus lots of close inspection about the only thing I can do?

Date: Wed, 14 Mar 2001 15:27:06 -0800 (PST)
From: Joe Foley <redmenaced@yahoo.com>
Subject: Re: [R-390] need suggestions for finding shorts in B+

First do the resistance checks in the manual for the tube sockets and plugs. Then if you still don't find it Familiarize yourself with the problem section's B+ circuit, then break it in the "middle". That will 1/2 your troubleshooting area, keep doing that until you narrow it down to the last section. THEN, if you still can't find it, ask again. And be glad its a radio circuit not a multi-story building or machine.

Date: Thu, 15 Mar 2001 10:26:20 -0500
From: "AI2Q Alex" <ai2q@adelphia.net>
Subject: RE: [R-390] need suggestions for finding shorts in B+ R392

I assume you're referring to P113-19/J613-19 connector at the IF amplifier strip. If the short you describe is on this line, it should be a relatively straightforward matter to zero in on the offending component.

If you study the distribution of the +28 Volts along this line, you'll note that at most stages of IF and audio there are 1 kohm series resistors feeding the plates and screens of the various tubes. These resistors make it easy (I should say easier) to isolate your short, because you can probably start by assuming (and you know about the derivation of that word) that they're not burned to zero ohms.

If there were a short on the "other side" of these resistors, it would likely mean they would overheat and/or burn "open." That IS a possibility, but let's assume for the moment that that is NOT the case (I also assume you've done a close visual and sniff-sniff inspection for burned parts by now).

So, it's more likely that there's a shorted capacitor on the distribution of the +28 V line. Looking at the schematic, I suggest checking wherever there's a bypass capacitor installed along the way. The most obvious points for a direct short would be C629 at V605, and then caps C605 at the AGC rectifier (If that is so, test the associated series inductor L604 for opens or wrong value due to heating).

Next, take a look-see at capacitor C714 over by the 200 KC oscillator V702. It's also fed by the same +28 V line.

Date: Thu, 15 Mar 2001 21:05:58 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: RE: [R-390] need suggestions for finding shorts in B+

I fixed it! This is great advice, and sorta what I was starting to think, too.

> So, it's more likely that there's a shorted capacitor .....

C629 was easiest to get at, and 1/3 chance it was shorted (after having looked at wiring for quite awhile). Pulled the lead, and sure enough, the short went away. Now off to Purchase radio for a suitable replacement for a 60 uF cap. The schematic says it should be 50uF - it just looks like a B+ filter capacitor to me - am I correct in assuming it is not terribly important what size (meaning either 50 or 60uF)? Thanks for all the advice, folks!

Date: Fri, 16 Mar 2001 09:51:57 -0500
From: "AI2Q Alex" <ai2q@adelphia.net>
Subject: [R-390] RE: limiter switch!

It sure does Paul. This is a bypass capacitor, pure and simple. It provides a low-impedance path to ground for any ripple, spikes, hum, noise, etc. that may appear on that dc line. In short, it's a filter cap. I see no reason whatsoever why you can't place a garden variety electrolytic on that line, and a polarized one is fine. By the way, electrolytics typically exhibit large tolerance variations from their marked values (+/- 20 to +/-40 percent isn't unusual), so don't worry about one that's 10 uF larger. Get a good quality cap that looks right to you and install it. Congratulations to you on fixing it. There's a special feeling associated with that!

Date: Mon, 26 Mar 2001 17:21:42 -0500
From: Thomas W Leiper <twleiper@juno.com>
Subject: Re: [R-390] R-390a Purchase

> What's the harm in leaving them in standby?

Beats me...maybe the theory is that the high voltage peaks and breaks down the filter caps. Mine run 24/7 and I never cared about extended standby, sometimes weeks on end. I buck my line down to 114V with a 1 KVA transformer to feed the racks, and nothing ever blows up, and I try to pull each radio out at least once a year to check tubes for weak ones. None in several years, and one of my SP-600s hasn't been touched in a decade of continous operation. I'll tell you the rig that has a constant appetite for tubes is the R-392. No matter what I do with voltage and cooling those things need at least a couple tubes a year.

Date: Sat, 21 Apr 2001 15:34:20 -0700
From: "Dave Kacir" <DkaciR@home.com>
Subject: Re: [R-390] R-392 Ramblings

Alex, can't recommend any tube sources outside of the obvious ones such as Fair Radio, however there does appear to be several sources on the WEB. Just wanted to congratulate you on your R-392. I have a Philco and

Stewart-Warner. They both needed their VFO endpoints adjusted (now within 200 Hz across the band) and were very much out of alignment.

I found that as with the R-390As, the IF gain adjustment was much to high. Even after alignment, I found the sensitivity was not as good as it could be. I reduced the IF gain and noticed a significant improvement. I haven't performed a sensitivity test yet, but it performs as well as my 390A and much better than my solid state receivers, so I haven't really felt the need to test-bench it.

I believe the pot to adjust is R521. Unfortunately, you have to remove the IF deck to get to it. I set mine at about half-way and found a decrease in noise with no apparent loss in sensitivity.

I also found that the LS-166/U speaker doesn't sound as well as my Kenwood R599 speaker. But what can you expect, the speaker for the 392 was designed to be weatherproof. With the way the receiver is designed, the speaker is probably submersible as is the receiver. Although I have to admit, I really don't have plans on trying the water dip test!

BTW, I want to thank the R-390A group for all your help. I have used many of the suggestions offered on this reflector and am impressed with what a great group of people hang out here. I'm sure I never would have thought of checking the IF gain if it wasn't for the 390A people. THANKS!!

One last thing, make sure your power supply is quiet. I had a switching-type and it created much noise on the MW and lower SW bands. I finally built a linear power supply and now the receiver has very low noise.....Dave

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Date: Sat, 21 Apr 2001 19:27:32 -0400
From: "AI2Q Alex" <ai2q@adelphia.net>
Subject: RE: [R-390] R-392 Ramblings

You're perfectly right about the group on this thread. Not only are they knowledgeable, but they're friendly. I sense a sort of fraternalistic can-do attitude here, which is something I haven't experienced since my Signal Corps days back in the mid-1960s. Good sense of humor too. Not too many flames, or flaming idiots for that matter.

Anyway, thanks for your comments on your R-392 findings. Yup, getting to pot R521 is difficult, as is the BFO adjust cap. Other than that, the '392 is a lot easier to work on than a '390A. Also, perhaps due to the lower voltage, considerably less dissipation, and "sealed" chassis, the components seem to stand the test of time better than on a R-390A. Or at

least that's the way it seems to me.

As for the LS-166 speaker, that's a good observation. I'll try another speaker once the set finds its home in this increasingly crowded shack!

My regulated 28-V power supply is my bench supply. It's current limited, and I notice that the set pulls about 2-A with the panel lights on Dim. Not bad (56-W). I have a MicroPac 28-V hybrid regulator that comes in a TO-3 case, so I plan to use that in a dedicated linear power supply.

Date: Mon, 10 Sep 2001 10:20:16 -0700 (PDT)
From: "Tom M." <courir26@yahoo.com>
Subject: [R-390] Repackage R-392 in new Box?

Because R-392's are so prevalent, high quality and cheap, makes me think that gutting one and repackaging it in a more conventional box might make a good engineering project. What do you think? Can the R-392 be easily separated from its box/front panel for use outside of the green box? Does the watertight construction present separation difficulties?

Date: Mon, 10 Sep 2001 14:17:47 -0400
From: Tom Leiper <twleiper@juno.com>
Subject: Re: [R-390] Repackage R-392 in new Box?

I have rack-mounted them in cut-out panels...just bolted them in and soldered pigtails to the back of the panel connectors for power, audio and RF. Worked great. As to "de-militarizing" the appearance, I suppose you could mill off the raised edges of the panel and repaint the panel lavender, and spray a little Cloe' in just for good measure.

Date: Mon, 10 Sep 2001 17:40:29 -0700
From: "Terry O'Laughlin" <terryo@wort-fm.terracom.net>
Subject: Re: [R-390] Repackage R-392 in new Box?

I bought a repackaged R-392 at the South Milwaukee hamfest maybe 15 years ago. It was in a lot of five R-392s (all for $100 - those were the days!) It was on a 19" rack panel and had some big plastic and spun aluminum insert knobs for the tuning dials. All the controls were remounted on the rack panel. The dial lock didn't work. Otherwise, it was nicely done and could have been redone to look great. I gave up on that radio when I dug into the circuitry and found that someone had butchered it trying to convert it to FETs. The FETs weren't the problem, the handiwork was. Whoever started the mod did nice mechanical work, but needed a lot of training in electronic work. I sold it as a parts radio with one of the other receivers that I fixed. Who knows, maybe it is playing in someone's shack today.

Date: Mon, 10 Sep 2001 22:58:24 -0400
From: Bob Camp <bob@cq.nu>
Subject: Re: [R-390] Repackage R-392 in new Box?

Well I guess the first question would be where do I get a cheap R-392 in good condition ? :)

If I was going to do this here's what I would do:
1) As few non-reversible things as possible
2) Only stuff that made the radio work better
3) Do it as part of a plan rather than a bit here and a bit there.

Pulling off the case isn't to hard and right there you cut the weight in half. You also significantly improve the cooling of the radio. Obviously that would be my first step. Once it was off then getting to the wires inside the radio would be much easier as well. So far 100% reversible and the radio works better.

Pulling the front panel would be a chore. In order to do it right you would need to come up with a replacement panel. Not to hard if you have a machine shop in the basement and more than just a little time to spend at it. Makes the radio look nicer and might allow you to spread the controls out a little. A lot depends on the wiring harness. Still 100% reversible and with the controls moved the radio works better.

New knobs would be a reversible mod with or without a new front panel.

The next step would be to re-wire some of the controls to allow you to get at them easier. At this point it's reversible, but only sort of. Once you pull the harness off of the controls I doubt that you can get it back on 100% like it was to start with. Pulling the waterproof connectors would be right up there as well, but again, tough to reverse the process. It's not impossible, but it would be hard to do.

The tuning dials and the counter are pretty much fixed relative to each other. It would be nice to get them out to R-390 type spacing but that would be a major chore. I think that mechanically you would stop before you moved them any.

With the mechanical stuff out of the way you could move on to the electrical stuff. First up would be getting the audio out of the radio and into an outboard amplifier. The 392's don't put out much noise and the HiFi craze came along after they left Cedar Rapids. Pulling the audio off of the equivalent of the diode load would be what I would try first. Run it into a little amp running a pair of 6L6's maybe. There should be a way to do it

just by unplugging a tube and going into the tube socket. 100% reversible.

The next step would involve some *major* research, I don't have the information to know how far you can push it. I'd look at separating the B+ from the filaments. Then I'd take a look at just how much B+ I could feed into the radio without messing anything up. I suspect that it might vary by stage and function. If you could get the B+ up into the 50 volt region I suspect that the overload performance of the radio would improve significantly. I'd also bet that you couldn't get it that high without running into trouble. You might be able to do it without moving very many wires at all.

Finally there would be the good old modify the BFO to turn it into a product detector. I suspect that the same sort of AGC time constant mods that work
so well on the R-390A would probably also work on a 392. Since it's just a pair of diodes tacked in parallel with other parts it's pretty easy to reverse. The rest of it would be a little different on a 392 but it should be worth the trouble.

Save the parts as you do the job and if the next guy wants to put it all back together then he's got what he needs. Also if you get into part of it and have to back out you still can do so. There's a lot to be said for belt and suspenders ....

Still looking for a cheap good condition R-392 :)

Date: Mon, 10 Sep 2001 22:18:45 -0500
From: "Bill Hawkins" <bill@iaxs.net>
Subject: RE: [R-390] Repackage R-392 in new Box?

Sorry, Bob, but you did something irreversible (as thermodynamic folks like to say) right there at the beginning: "Pulling off the case isn't to hard and right there you cut the weight in half. You also significantly improve the cooling of the radio. Obviously that would be my first step. Once it was off then getting to the wires inside the radio would be much easier as well. So far 100% reversible and the radio works better."

Dead wrong! Once you have opened the case and left it off, the aroma of 1955 begins to dissipate. In a few hours it is gone, and cannot be recovered. But then, there are many people who have no sense of smell, judging by the people repellent that passes for perfume these days. So it doesn't matter to most people. I think opening an R-392 is like stepping into a time machine. Destroying that aroma is like bypassing Route 66 with an Interstate Highway. That is something that people will do for money, but it is hard to imagine doing it just for kicks. "The radio works

better" - hah! Better than what? It is not as well shielded and it will not operate under water.

Date: Tue, 11 Sep 2001 00:40:40 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] Repackage R-392 in new Box?

Tsk, tsk, Bob -- unfortunately, you've just disqualified yourself from owning any R-392 -- cheap or otherwise. <heh heh> So forget the cosmetics, right? When tuned up, they work pretty good "as is". No longer fit for field use, though the case has other applications -- whipping up a gallon or two of gumbo, for example, on the input side. On the output side .... You're joking, right? Most everything you need to get to is available through the front connections.

Seriously, though, it's not unreasonable to loosen the allen bolts and pull the radio out of the case a couple of inches while running it. This way you can savor the aroma without losing it all, while running the radio a bit cooler. I thought of making up some kind of perforated cowling extension using standoffs or extra long bolts and some perforated aluminum -- painted OD of course. Then, maybe a 24vdc mini muffin fan for additional aroma therapy.

Nicer to whom? This radio is supposed to "look nice" to a grunt freezing his keester off in the Chosin Reservoir -- which means very mil, green and mortar-resistant. Also, those controls, while close together are ergonomically correct (for the time frame) and like certain WWII aircraft and other radios, designed to be operated with gloves on. Actually, due to the knuckle bashing feature and sharp, fingertip abraiding knurling on the tuning knobs (early 50's anti-N-K countermeasures), you are better off working the radio with gloves on. This will also avoid absorbing the lead in the paint through your fingertips, eventually sacrificing clarity of thought and general acumen ;-)

Not so fast. Have you ever seen an R-392 up close? Those are not standard 1/4 inch shafts. The knobs are keyed and fastened with screws endwise. You better not mess with 'em unless you're gonna have those made at a machine shop also. Besides, they're special metal knobs with two-way pointers and grooves which can be refilled with white liner. Many green radios use this style of knob. If they're grungy looking, they can be refinished. Most used stainless steel screws -- if not, ACE is the PLACE.

>The next step would be to re-wire some of the controls to allow you to
>get at them easier.

Huh? They're all up front -- whaddya mean easier? Lots more space around them than the typical Icom or portable whatsit with chicklet keys. You're kidding, right?

At this point it's reversible, but only sort of. Once you
> pull the harness off of the controls I doubt that you can get it back on
> 100% like it was to start with. Pulling the waterproof connectors would
>be right up there as well, but again, tough to reverse the process. It's not
> impossible, but it would be hard to do.

Yeah, I think you're kidding. (This is where you say "gotcha, Barry" ... "pull the harness off the controls" ... sheesh.)

> The tuning dials and the counter are pretty much fixed relative to each
> other. It would be nice to get them out to R-390 type spacing but that
>would be a major chore. I think that mechanically you would stop before
>you moved them any.

Right -- fuhgeddaboudit. Seriously tho' -- has anyone ever tried propping up a fresnel lens over a Veeder Root counter? Actually, what you can do is point your PC camera at the counter and read it from across the room on your monitor.

> With the mechanical stuff out of the way you could move on to the
>electrical stuff. First up would be getting the audio out of the radio and
>into an outboard amplifier. The 392's don't put out much noise and the
>HiFi craze came along after they left Cedar Rapids. Pulling the audio off of
>the equivalent of the diode load would be what I would try first. Run it
>into a little amp running a pair of 6L6's maybe. There should be a way to
>do it just by unplugging a tube and going into the tube socket. 100%
>reversible.

I don't think that's necessary ... Actually, many of us use the "correct" LS-166 plug 'n play speaker with this. These are waterproof with perforated blowout protection inside and out. Hence, they sound terrible. One trick -- drill a small hole in the back of the LS-166 and mount a mini phone plug for an external speaker, or just get a cutoff. Another "mod" is to replace the water and concussion resistant driver with a full range one. There's a solid state replacement for the audio output tube, which saves on heat, but is said to be compatible only with Stewart Warner units (or maybe just some S-W's).
>
> The next step would involve some *major* research, I don't have the
> information to know how far you can push it. I'd look at separating the
>B+ from the filaments.

Go check out Josh Rovero's pages on the R-392 for some basic background. The power connector brings the B+ out separately from the filament supply as-is (contacts A and D, respectively, as I recall -- E is ground) Research has already been-there-done-that. Optimum seems to be 24 volts for the fils and 30 for the B+ according to Josh's pages. Not worth the bother though -- run at a compromise of 28 vdc -- which is the vehicular voltage when the engine is running, or, crank down to about 24 vdc to favor conservation over performance -- especially since some of the tubes are becoming hard to find.

Then I'd take a look at just how much B+ I could feed into the radio without messing anything up. I suspect that it might vary by stage and function. If you could get the B+ up into the 50 volt region I suspect that the overload performance of the radio would improve significantly. I'd also bet that you couldn't get it that high without running into trouble. You might be able to do it without moving very many wires at all.

No need -- see above. Maybe 32 volts? It's been done.

> Finally there would be the good old modify the BFO .....

The '392 is more related to the non-A than the A, but very different from either of them. There are probably loads of mods to read up on. I have one of the most modded '392's in captivity --- 100% solid stated, runs on 12 vdc 250 ma with the dial lamps on, 80 ma with them off. Of course, it doesn't perform as well as the stock ones I have. Best "mod" is a full alignment. If you want to improve SSB performance, wear thinner gloves when you set the BFO. Then, if the yakkers still sound like quackers, well, y'know what they say -- if it sounds like a duck ...

> Save the parts as you do the job .....

Better yet -- leave the original parts in unmolested. If you want a different radio, get a different radio.

> Still looking for a cheap good condition R-392 :)

No offiense intended, Bob, but I think theyve all grown legs and are running the other way. ;-) There are some reversable mods that make some sense and are definitely worth considering -- mainly dealing with plug compatible FET's to reduce heat and conserve increasingly scarce 26 volt tubes. This is supposed to be possible from what I've read. I keep meaning to dig out that solid stated '392 to ferret out some details, however, many of the mods were not reversable and I don't know if many of the directly "plugged in" transistors are still available.

Date: Tue, 11 Sep 2001 07:54:24 -0400
From: Bob Camp <bob@cq.nu>
Subject: Re: [R-390] Repackage R-392 in new Box?

One of the problems I generaly had back when R-392's grew on trees and cost next to nothing was getting the mating plugs to the connectors. You saw far more radios out there than you did connectors to mate with them. That generaly made some kind of fiddling nessisary to get signals in and out of the radio. I never saw a reasonable way to do it without some surgery as in pulling a fuse holder.

The LS-166 is a wonderfull piece of sound engineering. I have one sitting on the bench in the other room. Right now it's hooked to a R-390A. To make it authentic it looks like it was run over by a tank a couple of times, but it still plays just fine.

I set out to solid state a R-392 back in the early 70's. I never have gotten around to doing it. To your point once you align them they seem to work pretty well with the tubes in them. I do think that some kind of audio pick off would help though.

Date: Tue, 11 Sep 2001 09:09:11 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] Repackage R-392 in new Box?

> One of the problems I generaly had back when R-392's grew on trees and cost next to nothing was getting the mating plugs to the connectors. You saw far more radios out there than you did connectors to mate with them.

Really? For the last few years at least, and I assumed way back too, Fair sold the power connector for about $9 but only with a radio, until they ran out of R-392's recently. Those connectors were purchased new by them from another source. The LS-166 and other accessories with the same multi-audio connector were fairly common, and used on other green radios, such as the GRC-106 and R-174 (GRR-5?). I bought some of the connectors used, as "cutoffs".

> That generally made some kind of fiddling nessisary to get signals in and out of the radio.....

Well, the audio connector isn't easy to work around, but not so hard to find used or as part of something -- speaker, headset, handset, etc. The power connector is easy -- just three round crimpon connectors -- soldered to the wires and adjusted for snug push-fit on the A, D and E pins. Butt connectors work well, or the round snap-together terminals. That's an old trick, commonly used on the non-A, R-1051's, etc. If you do it carefully

and fashion a strain relief out of a rubber covered metal, or nylon cable clamp mounted to an existing panel screw, it will hold up well. For some other connection, the spare fuse holders can be used. They're oversized -- so the best thing to do is cut off the back of the fuseholder and drill the cap to fashion it into a strain relief for the wires passing through the front. But if you leave the front panel loose for ventilation, you can run wires in and out any-which-way, with no surgery.

> The LS-166 .....

You can still get these as NOS from Fair for under $30 in your choice of semigloss OD or flat CARC. Used ones come complete with paint chippage", but not authentic run-over condition, for somewhat less.

> I set out to solid state a R-392 .....

I think those plugin subs for the audio output tube are supposed to be good -- if they work with the specific radio. That subject has come up on the list once or twice.

From: Harry Joel <organic@cyberlane.net>
Date: Thu, 03 Jan 2002 20:22:39 -0600
Subject: [R-390] R-392 Newcomer to the Club

Greetings to all, just joined the R-390 mail forum. Not sure if there is one for the 392. I am anxiously awaiting my R-392 (wife calls it the Green Monster after seeing a pic of one. Read the TM twice and found a great power supply (28V) to feed the monster on eBay. Looking for help on finding a supplier for the power IN connector. The TM only mentions a Government Issue Power Cable. with a 14s insert in the connector.

Date: Thu, 3 Jan 2002 20:44:10 -0600
From: mikea <mikea@mikea.ath.cx>
Subject: Re: [R-390] R-392 Newcomer to the Club

Failing some other 392-herder telling you what, you might take careful measurements, note number of pins, size, location, and spacing of pins, thread diameter on the socket (well, it's fixed; the plug is on the cord), and shell diameter. Then hit www.alliedelec.com and rummage through the 6 or so pages of MS connectors. Shouldn't take more than a few weeks, between bouts of recovery in the most convenient place to get over mental breakdowns. The 14s may be a _big_ help.

From: "Steve Goode" <goode@tribeam.com>
Subject: Re: [R-390] 6DC6 Replacement
Date: Wed, 16 Jan 2002 09:41:04 -0600

Alright! I must confess that I have had similar evil thoughts.

WARNING---SAND STATE THOUGHTS TO FOLLOW!!!!

I love the way my R-390A performs. Right now the only sand in it is the Navy approved power supply changes. It even has a working ballast tube. But I want this receiver to work forever! So what happens when I run out of tubes? My thoughts are that anything behind the mechanical filters is fair game since that should have minimal performance hits in dynamic range, sensitivity, etc. So I was thinking of looking at the IF, detector, agc, calibrator circuits to start experimenting on. What I have found so far in discussions with others who have actually done solid state conversions is an article from the April 1977 QST (it is not the April fool article). This article shows how to make plug in solid state replacements for any tube using JET or MOSFETs in cascode with high voltage transistors. This is as far as I have gotten. Anyone else willing to confess? Anyone actually succeeding in doing a solid state conversion?

From: "AI2Q Alex" <ai2q@adelphia.net>
Subject: RE: [R-390] 6DC6 Replacement
Date: Wed, 16 Jan 2002 11:38:37 -0500

I confess! I've poked JFETs into both 26C6 mixers on my R-392, and those 24-V stages work really well. I used a Dremel tool cutter to scribe the glass of 7-pin miniature tubes, cracking them open and removing the innards. I then soldered the JFETs with drain source and gate connected to the old plate, cathode, and grid leads, respectively. After inserting a label with my callsign on it, I then glued the glass envelopes closed. I popped 'em into the R-392, where these solid-state jobbies perform flawlessly. I can elaborate about the glass cutting procedure if you're interested.

As per the 1977 QST article, last night I fired up an 1800-volt bipolar junction transistor in the relay circuit of an old Drake TR4. The device is a TV horizontal output transistor.

I pulled the relay driver tube and put my little solid-state jobbie (fabbed on a scrap of circuit board) in there with some clip leads, with my VTVM hanging in to see what's happening with the switching levels. I also put a reverse-biased diode across the driven relay in order to quash any possible counter-EMF that might do in the transistor. The xstr that drives the relay is in turn driven by a cheap N-channel JFET such as an MPF-102 or MPF-105, which derives its Vdd from a diode and a 300 uF cap hanging off the filament line as a simple halfwave rectifier/filter. The FET gate is extremely high-Z, and sees the control voltage at a VOX/anti-VOX

summing point. Works like a champ and offloads the filament line.

Now on to RF "replacements." Finding suitable high-voltage FETs for the cascode circuits may be a problem. The Idss of the output FETs in these pairs has to complement the input FET. As for dual-gate MOSFETs, I know that Dan's Small Parts has some.

Your thoughts?

From: Harry Joel <organic@cyberlane.net>
Date: Fri, 25 Jan 2002 09:12:11 -0600
Subject: [R-390] R-392 Mech.Parts Question

Checking out my recently obtained R-392, I discovered the Bandwidth (three position) knob was free-wheeling. The coupling from knob shaft to rotary switch shaft is made up from three pieces. There is a matching slot on the top and middle coupling piece. A part must have been there at one time to link the two together. A view is here:

http://www.cyberlane.net/~organic/R-392-Bandwidth-Coupling.jpg

I dont quite understand the need for a three-piece coupling here and would like to hear from experts.

Any help from R-392 owners is appreciated. I am still in the midst of resolving the DOA condition of a receiver that, according to the seller was last used some years ago and worked fine. Shoudda spend the time to take the Greyhound to the owners city to assess the condition of this receiver. Mechanically it seems to be in better than average shape. The tag says Serial Number 698 - Reworked by Stewart Warner Electronics. Inside markings tell me that it was built by Collins.

Date: Fri, 25 Jan 2002 09:28:10 -0600
From: mikea <mikea@mikea.ath.cx>
Subject: Re: [R-390] R-392 Mech.Parts Question

It's an Oldham coupler, which compensates for any misalignment (well, _some_ misalignment) of the front panel and chassis. IIRC, Fair Radio has them for R-390-flavored boatanchors, and for not too much money. I don't know if the 392 and 390 couplers are interchangeable.

Very nice photo. Thanks; good photo work makes questions like yours _much_ more answerable.

Date: Fri, 25 Jan 2002 11:30:26 -0500
From: Barry Hauser <barry@hausernet.com>

Subject: Re: [R-390] R-392 Mech.Parts Question

As Mike pointed out, that is an Oldham coupler -- excellent photo.

Yes -- you are missing the center part which looks like a thick washer with a raised line on each side at 90 degrees to each other. Take a look somewhere in the chassis, and particularly in the case where loose parts like to roam. It's usually made of metal, but some are nylon, particularly for the smaller ones. The part may not actually be a washer shape on this type, but more of an "X" made of metal or nylon. The "bars" of the X are offset as if you nailed two teeeny tiny boards together, or two pieces of pipe.

If you find the center part, then to install, just loosen one coupling and back it off so you can slip the center piece in. The couplings set up with their slots at 90 degrees to each other, forming an "X". You can put a bit of grease or oil on the center piece. Then slide the loosened coupler up snug, and tighten -- you'll need a bristol wrench -- these aren't allen/hex screws.

If you can't find the part, try Fair radio, but tell them which coupler it is -- send them your photo by email.

If they don't have them, you may be able to fabricate the part, or just wire/tape up the two halves so that it's strong enough to turn as a unit. There isn't much stress on that coupling as long as you don't try to turn past the stop. You could even back 'em off, clean the ends with solvent, then put a dollop of silicone rubber seal or some other rubbery stuff like liquid rubber in between and then press together (right on the shafts) and allow to set.

Finally Harry, the purpose of that coupler was to compensate for mismatched lineup of the shafts due to variations in manufacture, positioning of the hole in the front panel relative to the selectivity switch which is way in the back. From the look of the photo, yours turned out nearly perfectly aligned, so you probably could use a solid coupler or make these solid by means of battlefield improvisation, which would be thematically consistent with the radio.

As for the DOA, don't fret. It's common that after storage and a trip that some of this stuff doesn't work. Of course, "selective memory" of the seller is sometimes a factor. Check the tubes, look for any loose connectors. I haven't not been able to make a '392 work yet with hardly any effort, including the first one I got which has no tubes left at all. (someone solid stated the whole thing.).

Date: Fri, 25 Jan 2002 14:17:38 -0500 (EST)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] R-392 Mech.Parts Question

.....that is an Oldham coupler -- excellent photo.

I agree - that is a great shot! It occurs to me that a trivial fix for that is to go to a hobby shop, get a small length of square bar stock of appropriate dimension, cut to fit, and put a rubber band around the thing (or tape or glue or wire wrap) to
hold the bar in. The oldham coupler, as someone described, stays inserted, and a bar wouldn't. But a bar would get the job done a lot of the time. Another approach is to use two pieces of stock - a square piece to lock the two couplers together, and a tubular piece to slip over the joint - it would be held in place between the screws of the opposing couplers. I took his excellent picture and put some notes on it. You can see it at:

<http://www.pdq.com/boatanchors/r-392/R-392-Bandwidth-Coupling.jpg>

I personally would favor that over epoxy or other glues that might gum things up otherwise.

From: "Jon & Valerie Oldenburg"
<jonandvalerieoldenburg@worldnet.att.net>
Subject: Re: [R-390] R-392 Mech.Parts Question
Date: Fri, 25 Jan 2002 22:54:33 -0600

small parts company stocks a selection of Oldham couplers:
www.smallparts.com) Jon AB9AH

Date: Thu, 28 Feb 2002 09:49:45 -0600
From: "Anderson, Craig - Ext. 1365" <Craig.Anderson@sptc.mnscu.edu>
Subject: [R-390] Question about R-392 1961 Dubrow COntract & V201 & V202

After many R-390A's and SP-600's I finally decided to acquire an R-392. I was lucky to find a very nice 1961 Dubrow contract radio with connectors and noticed that V201 and V202 are 26FZ6's instead of the 26A6 listed in my 1954 edition of the tech manual. Does anyone now the reason for the change to the 26FZ6? I have two tube testers and even my Heath TT-1 with the 1976 tube data supplement doesn't list the 26FZ6. Any ideas how to test these? Also, it came equipped with the factory Dubrow solid state audio replacement. but I am getting no audio. Is the schematic listed on "Provero's" website as the "official schematic" of the solid state audio replacement, the correct schematic?

From: Francesco Ledda <frledda@attbi.com>
To: r-390@mailman.qth.net
Subject: [R-390] R-392 Dubrow PTO endpoint

All, I am struggling with a Dubrow PTO for my 392. The endpoint is about 3 kHz off, and I am at the limit with the coil adjustment. Any suggestions?

Date: Mon, 8 Apr 2002 05:56:43 -0700 (PDT)
From: "Tom M." <courir26@yahoo.com>
Subject: Re: [R-390] R-392 Dubrow PTO endpoint

I've never worked on a Dubrow, but I think it is the same as a Collins. This is a very common problem. One author wrote that this mod is not worth doing, but I can't disagree more. What you'll need to do is remove the cover, find the PTO endpoint adjusting coil, and remove one turn from it, and then start over. I find on some PTO's that it is easier to make a new coil than to trim the old (Cosmos in particular), but that will be your call. This will keep you in business for the news 30 years or so.

From: David Wise <David_Wise@Phoenix.com>
Subject: RE: [R-390] R-392 Dubrow PTO endpoint
Date: Mon, 8 Apr 2002 10:38:05 -0700

> From: Tom M. [mailto:courir26@yahoo.com]
> What you'll need to do is remove the cover, find the PTO endpoint adjusting
> coil, and remove one turn from it, and then start over. The endpoint is about 3 >kHz off, and I am at the limit with the coil adjustment.

Unlike most of the tuning slugs I've turned over the years, the R-390A's PTO slug seems to lose permeability over time. (Usually I see them gain.) When you tune a PTO down in oscillator frequency, you are changing the coil from an air-core coil to an iron-core one. With a slug that's less permeable than it's supposed to be, this changes the coil inductance less than it should, giving you a smaller than expected frequency spread*.

The spread is trimmed by the endpoint coil, which is in series with the main one. Their inductances add. The endpoint coil has the largest effect when its inductance is the largest-possible fraction of the total. When is this? At 3455 (i.e. dial 0), because the main coil is at minimum. (This is analogous to the more common capacitive tuning scheme, with a trimmer in parallel with the main cap.) The subnormal inductance spread of the main coil dictates a small endpoint inductance. That's why you remove a

turn instead of adding one.

It might also be possible to restore the spread by changing the size of the tank capacitor. To get a 3.455:2.455 frequency spread, the inductance has to change over a 1.9806 ratio (3.455/2.455, squared). For any given frequency, a larger capacitance dictates a smaller inductance, which is achieved by translating the slug's 10-turn range in a direction away from the coil. With the inductance tending towards smaller values, the max/min ratio would be larger and you'd get a larger frequency spread, which is what you want.

I HAVE NOT TRIED THIS. The straight-line-frequency variable pitch of the R-390* PTO coil may throw my reasoning out the window. But since you're already hacking, it's less intrusive to tack on a cap than to chop a coil. Note that with the main slug in a different relation to its coil, you will have to do the dreaded linearity calibration. But the slug has already changed (that's why you
ran out of endpoint), so you might need to anyway. Take a linearity reading, add a cap, read again.

Note also that the Temperature Coefficient of the added cap is important, but don't freak out. My PTO turned out to pretty far off, which means that yours
might be too. It's not surprising; if a slug changes permeability, why not TC?
Experiment with different TCs until you get satisfactory overall stability.

* It seems to be accepted jargon here to call this "long", but as I mentioned to Tom, it makes me flinch, because I've always compared the electrical spread to
a 10-turn mechanical baseline. The electrical spread is "short". If instead you take 1000KC as the baseline, you have to turn the dial "long"er than 10 turns. Say what you like; I'm going to footnote my usage from now on.
73, Dave Wise

Date: Sun, 02 Jun 2002 11:43:15 -0700
From: "James A. (Andy) Moorer" <jamminpower@earthlink.net>
Subject: [R-390] New R-392 owner

I just acquired an R-392 that is claimed to be working.
Is there a "must replace" list for the R-392?

I know for the R-390A, there are certain capacitors that you replace on sight before you power up the unit. Does the R-392 have any such that I should know about? I understand that nothing in the universe is as sensitive as the R-390/A,

what kind of performance should I expect from the R-392? Is it at least comparable?

From: "WF2U" <wf2u@starband.net>
Subject: RE: [R-390] New R-392 owner
Date: Sun, 2 Jun 2002 15:25:17 -0400

Andy, As a long-time owner of 3 R-392's (I've owned one of them for about 18 years, never had to change even one tube in it), I can tell you that they're basically plug-and-play, unless a previous owner did mess it up... Due to the low voltages used in it, (24-28VDC) the components suffer much less "wear and tear" than the R-390(and A) models. I never experienced any shorted capacitors or way out resistor values in them. Performance-wise, the R-392 is a little less sensitive than the R-390 (or R390A). As to "nothing in the universe is as sensitive as the R-390/A", this is not quite true. I have 3 German receivers of the same general vintage as the R-390/A (1950's and 60's), each of them has better sensitivity according to their original specifications, than the R-390/A. They are the Rohde & Schwarz EK-07, the Siemens E309a and the Siemens E311b. The increased sensitivity of the R-390/A is achieved by individually tweaking the receivers and selecting tubes (there is an article regarding those measurements and how the results were achieved). The R-392 has a very decent performance and I use it a lot on the ham bands (in conjunction with its matching transmitter, the T-195), as well as for some short-wave listening. Good luck with yours and enjoy it. 73, Meir WF2U

From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] New R-392 owner
Date: Sun, 2 Jun 2002 16:38:29 -0400

My experience -- though not as lengthy -- agrees with Meir's. I have 5 or 6 R-392's. (One or two are usually hiding somewhere.) Maybe needed some tubes on initial delivery, some not at all.

There may be a tendency to "under-do" with these -- or maybe it's just me. Anyway, I finally got around to aligning a couple of them both of which seemed to be working OK. Quite a difference. Josh Rovero had a performance comparison between the R-390 and R-392 on his website but none of the links seem to work anymore. As I recall, they were very close. The biggest factor in actual use may be the more limited choice of bandwidths.

In one area, the R-392 wins hands down against all: Operation while submerged. Not to mention that it floats. (but panel side down, so bring your goggles and a a snorkel with an extension on it.)

When water resistance is not an issue, it may be advisable to run the radio either without its case, or at least slipped out of it about an inch for ventilation. Please don't drill any holes.

Date: Sun, 2 Jun 2002 18:35:04 -0400 (EDT)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] New R-392 owner

One more thing I could add is this - the ones I have all seem to need more mechanical repair from heavy use or misuse than the R-390, R-391 and R-390A's I've had. I seemed to find more broken geneva couplers, truly worn cams, broken or missing clamps, especially problems in the bandwidth switch mechanism. Other than that, I've had only one real electrical problem, which was a shorted B+ filtering capacitor. Like the R-390, it is tight quarters to work in - the 390-A seems to have more space and better layout.

Date: Wed, 12 Jun 2002 16:06:47 -0400
From: Roy Morgan <roy.morgan@nist.gov>
Subject: Re: [R-390] Another R-392 question

>Gee, I noticed that all the tubes in this R-392 have shiny shields and not
>the nifty IERC shields. Should I immediately replace them all with IERC?

Ask yourself how hot the tubes get. With 28 volts on the plates, they may not get hot at all. Put your finger on them to find out.

From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] Hello New to list- More questions
Date: Thu, 8 Aug 2002 23:14:56 -0400

Hi Mike & Crew: Guess I'd rather write about 'em than do 'em tonight, but since we're on a roll: Biggest problem with the R-392 is that they're small and green. So, compared to the big gray jobbies, they're oft negelected. Small enough (about 11 inches in all directions) to stow in the bottom of a closet and forget it's there for a few years. I've had a bunch of them and they all worked either on delivery or after a bit of tweaking - tubes, adjustments, etc. Haven't had any capacitor failures at all. One day, I actually sat down and did a full alignment on one. And then I tried it with something other than the "official" LS-166 speaker. The LS-166 is waterproof and concussion resistant, so not exactly hi-fi. It is authentic and plug 'n play so that's what most of us use. However, the easy thing is to tap off the inside of an LS-166's transformer and run speaker leads to a modern speaker to hear what the audio is capable of. Results were impressive. They are comparable in performance (almost) to a non-A,

with the main drawback being the limited number of bandwidth settings. This is one tube radio that's also a "tub" radio if you wanna. One list member tested the waterproofness of his that way. The R-392 actually floats, but unfortunately, upside down, so you'll need your snorkel and goggles. Powering the '392 is no big deal. A reasonable 24 volt supply with about 3 - 5 amps will do, though should be 28 vdc. Don't forget, these ran off vehicular power -- 24 volt nominal, 27-28 vdc actual, so not too smooth or steady. There was a nice piece with performance comparison on Josh Provero's web site, but it's not where it was and I haven't found a new URL for it. (anybody know?) One recommendation was to use two P/S's -- with 24 volts for the filaments and 28 or more for the B+. The pins are separate on the front panel jack, but usually strapped in the connector. Another way to power them is to use a pair of 12 volt gel cells and charge them up between uses with a trickle charger. (Can use a 12 volt charger by switching them to parallel.) Go get one, but try to keep it from the closet or under the bench. Tell your XYX it's the latest fashion shade of avocado and put it in the kitchen. Or maybe the patio or near or in the pool. Excellent pool radio, in which case, go with the LS-166. Betcha they sound better under water.

From: "Bruce Ussery" <bruceussery@hotmail.com>
Date: Tue, 13 Aug 2002 19:49:05 -0400
Subject: [R-390] R-392 quest for power

I've had this R-392 (not an A, not a Chevy), for a couple of weeks and have been enjoying it on the kitchen counter which is also green so it looks great. It's an actual working radio, unlike the ones I usually bring home. All bands fairly hot, fairly accurate. My only problem is finding a better way to power it. The homebrew supply that came with it (very basic- xfmr, square bridge rectifier, 33,000 uf cap) doesn't make any radio noise, but it has about 170 mV RMS ripple, which I can hear on CW or SSB. It's also putting out right at 30V which worries me a little. I've tried 2 regulated supplies; a Systron Donner bench type supply, and a Power One open frame job. Their outputs are clean as a whistle, but they both radiate a loud buzz into the receiver from about 8 Mhz on down. (Too many solid state gizmos.) This temporary?? kitchen setup is truly less than ideal- a 15 ft. wire across the top of the cabinets and no ground. A temporary ground hooked from ant. ground to the AC outlet helped the buzz some, but it's gonna take more I think. I verified totally quiet operation with two 12V batteries. I not totally against using batteries as a permanent solution- that's how I power my "late model" ham rigs. It just gets messier having to deal with 2 batteries, lacking a 24V charger. Anyone have similar noise problems on the lower bands?

From: "Jack Antonio" <scr-287@sbcglobal.net>
Subject: Re: [R-390] R-392 quest for power

Date: Tue, 13 Aug 2002 17:48:57 -0700

>I've tried 2 regulated supplies; a Systron Donner bench type supply,
> and a Power One open frame job. Their outputs are clean as a whistle, but
> they both radiate a loud buzz into the receiver from about 8 Mhz on
down.

One thing to try, put a .01uf disc ceramic across each rectifier diode. This cleaned up a couple of my solid state supplies. You might also try a .01 from the transformer secondary leads to ground, and make sure the case of the the power supply and receiver are tied together. Hope this helps

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Date: Tue, 13 Aug 2002 19:19:31 -0700 (PDT)
From: Rodney Bunt <rodney_bunt@yahoo.com>
Subject: Re: [R-390] R-392 quest for power - Circuit idea...

There are two pins for power on the connector

Power Pins A & D +24VDC, Pin E is Ground

One is for the fillament/heater circuit, the other is the plate B+ supply. Easy to check one lights the tubes!!!! The B+ requirements are quite modest, so a simple 3 terminal regulator (such as a LM317 with heatsink) from the +30v to the B+ will give you the quiet supply that you want without much heat...

Subject: RE: [R-390] R-392 quest for power - Circuit idea...
Date: Tue, 13 Aug 2002 19:53:53 -0700
From: "David Wise" <David_Wise@Phoenix.com>

I can't speak for the bench supply, but if that Power One is a switcher, it will radiate all kinds of crud, loudly. If it's a linear, I don't know, maybe that tip about small caps across the diodes. The manufacturers don't worry much about RF emission.

From: "Bruce Ussery" <bruceussery@hotmail.com>
Subject: RE: [R-390] R-392 quest for power - Circuit idea...
Date: Wed, 14 Aug 2002 21:59:29 -0400

Guys, Thanks for all the great tips; I've got some tinkering to do. I forgot about bypass caps on the rectifiers, and since the buzz sounds a lot like light dimmer noise, that may be the source. I like the split supply idea too.

From: "WF2U" <wf2u@starband.net>
Subject: RE: [R-390] Broke 390
Date: Sat, 17 Aug 2002 12:18:29 -0400

All the R-392 needs is a 28 VDC supply at least at 3 amps. It doesn't have to be regulated, just well filtered.

Date: Fri, 25 Oct 2002 15:42:31 -0700
From: Dan Merz <djmerz@3-cities.com>
Subject: [R-390] R 392 T-602 bfo

Hi, I am puzzling over the three connections to the bfo unit out of an R-392 receiver, T-602 type 70J-2. Looking at the connections end on, the one first one starting at 9 oclock is the the number 1 connection going to the grid capacitor and the bfo pitch capacitor, but then I'm not sure about the other two that are adjacent going clockwise. I think the next one is the cathode connection (called number 3 in the schematic I have) and the most clockwise one is the ground connection (called number 2) in the schematic I have. The schematic is from TM5820-334-35-13, which is the only documentation I have in hand. I've looked at the pictorals in this manual but can't convince myself about this conclusion from the appearance of the wiring because details aren't that good. I did some resistance measurements but without knowing how the lower leg is wound (continuous with tap vs. additional coil wound on top of first) I don't really know how to interpret the measurements. Does anyone know the answer? thanks, Dan.

Subject: RE: [R-390] R 392 T-602 bfo
Date: Mon, 28 Oct 2002 15:10:00 -0800
From: "David Wise" <David_Wise@Phoenix.com>

There is no strong reason for it to be different from the R-390*, in which it's a single winding with a tap near one end. The end nearest the tap is ground, the far end is the grid and resonating cap, and the tap is the cathode. If I'm remembering right, that's a standard Hartley oscillator circuit.

Date: Mon, 28 Oct 2002 22:39:05 -0800
From: Dan Merz <djmerz@3-cities.com>
Subject: Re: [R-390] R 392 T-602 bfo

Hi, thanks to Roy Morgan for looking and reporting the pin order as 1, 2, 3
clockwise on T 602 going from grid, ground, cathode so it should work the
first time I hook it up, hi. thanks to the others that answered and offered help. By the way I must confess that this bfo unit is going into a Mackay 3010C that was missing several subchassis units that I'm replacing, bfo/bc band h.p. filter and attenuator. Somebody must have designated

this a spare parts set at some time and robbed it. The dial tape mechanism is kaput also and missing some parts - I have a nifty digital display kit put out by AADE that is programmable for a large number of sets to adjust for i.f. / vfo that will fit nicely behind the original dial window so that's my solution for repairing the dial, at least for now - unless I run across a source for the original 16 mm fiberglass dial tapes. Dan.

From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] R-392 Audio Module
Date: Sun, 10 Nov 2002 22:50:17 -0500

No -- not that audio module, but an oddball retro-fit. Once again, a toob radio turns up on my doorstep with something other than all tubes plugged into it.
This one is Model 1240 audio amp made by Epitek Electronics, Ltd. of Ottawa.
It's about 1 X 2 inches and a bit over 1/4" thick with an aluminum plate (probably a heat sink). The back is marked "R-76-49" I found this, along with a 1000 mfd 50v electrolytic, stuffed into the cubby where the 26A7 is supposed to go and secured with masking tape. (yup) It looks like the cap tossed its cookies. There's also some white stuff around one corner of that module, but I don't know if that's an inside job or not. Anyone know anything about this module. Obviously a home brew addition. Only 5 solder-on terminals -- "GND" wired to pin 2 & 7 (grounded) of the tube socket, "IN" - wired to pin 3 (which makes some sense), "+40" - hooked to pin 6 (26v filament). "OUT" is wired to pin #1 of J613 -- bypassing the output transformer and going directly to the audio out. The fifth terminal is marked "CAP" and connected to the negative lead of that electrolytic. The positive lead was just dangling -- apparently disconnected itself and it looks like it was originally tacked onto the "OUT" tab. Does this make any sense -- a 1,000 mfd cap from the output to what? It also appears that the original wiring was left unmodified to the tube socket - there's some instances of "tack soldering" which suggests tentativeness (i.e. "It still don't woik!") Anybody have any info on this module? Any suggestions? Probably doesn't pay to mess with it -- I'll probably pull it out and re-tubify the audio.

From: "Bob Tetrault" <r.tetrault@attbi.com>
Subject: RE: [R-390] R-392 Audio Module
Date: Sun, 10 Nov 2002 20:31:58 -0800

Without aligning myself in any way with something that can only be viewed
with disgust, I do have to point out that modern low impedance solid state audio output modules do not need coupling transformers to match the 4 to

32 Ohm speaker impedances, but do need a means of de-coupling the speaker from the DC potential present at the complementary symmetry output connection. Hence, the large electrolytic... The module was probably capable of some watts of power output. The larger the cap value, the more power to you, Buckaroo, especially at the low frequency end. Imagine amperes of current through the cap to a woof-woof...

Date: Mon, 10 Mar 2003 11:28:14 -0500
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] 390A Aligment and 392 IF out.

Thanks for the answers to my sort of obscure alignment questions. I followed the suggestions which worked very well and have installed the R-390A in its rack. It's working well and I'm quite happy with it. Now I'll get back to my synchronous quadrature detector project using the R-390A IF out. I have an R-392 but its IF out saturates on strong signals and I haven't yet tracked that problem down. Any previous experience here? I replaced the cathode follower with an op-amp (Its a plug into the tube socket so I didn't do any drilling and blasting ;-) which improved the output, but didn't completely fix it.

From: "Robert Nickels" <w9ran@oneradio.net>
Date: Sun, 13 Apr 2003 20:25:19 -0500
Subject: [R-390] R-392 Audio Problem

I just noticed that my R-392 has an audio problem. The receiver seems to work OK otherwise, except the audio level is very low, barely audible on LS-166 speaker at full AF gain. The odd thing is, there's not much distortion until you crank it wide open - just a fraction of the normal amount of audio power. Before I tear into it, I wonder if anyone has run into this problem or has any suggestion of what might cause it.

Date: Sun, 13 Apr 2003 20:34:54 -0500
From: Tom Norris <cthulhu@fhtagn.org>
Subject: Re: [R-390] R-392 Audio Problem

Does it have the "stock" tube audio output or the later solid state module? If it has the tube AF, what is your place voltage going into the RX?

From: "Robert Nickels" <w9ran@oneradio.net>
Date: Mon, 26 May 2003 11:33:47 -0500
Subject: [R-390] R-392 fixes itself

A while back I'd asked for suggestions on what might be ailing my R-392 which had very low audio. I appreciate the hints but it turned out to be a miracle cure I followed the troubleshooting procedure outlined in the

manual (one of the best I've seen, btw). I found that it is possible to run the upper deck out of the chassis with care and one BNC extender but due to the presence of MFP making it hard to probe the socket pins (not to mention it's crowded under there!) I used the tip suggested in the manual and just stuck the end of a short piece of small insulated wire into the tube socket pin I wanted to measure and then plugged the tube back in. A good "field expedient" if you ask me. Anyhow, I found good audio at the diode load but almost nothing on the grid of the first audio tube. I suspected a coupling capacitor but in this Stromberg Carlson-built unit they are all Sprague Vitamin Qs and those never fail, in my experience. After probing around a bit - the speaker audio came back loud and clear. My best guess is that an ohmic connection had "grown" thru the MFP at a point where the resistor on the grid made physical contact (or very near) a grounded standoff. This "fix" seems to be permanent, although it's never as satisfying as when you find a bad part that you can at least toss in the trashcan afterwards! Just wanted to share a bit about the R-392 which remains another great example of the 390 legacy. One more thing - it only takes a few seconds to remove the deck - just don't lose the oldham coupler on the bandwidth control! PS: Since I run this rx in a 24 volt vehicle, I'd like to find the solid state audio module plug-in if anyone has one, tnx.

From: "Merle" <lal@cyberwc.net>
Date: Sat, 31 May 2003 19:05:07 -0400
Subject: [R-390] R-392

Hello to the list.. I have purchased, my first, R-392 receiver ! It is in fair shape but can be restored nicely. I would like to purchase the following if any of the list members have them for sale, if not then I will try Fair Radio and any others who might sell parts for these radios. I am in need of the male and female power connectors, the headphone connector (the one that is mounted in the front panel) a speaker with the cord and connector attached and lastly the little BNC jack with the chain that is used to cover the IF output connector. Thanks for reading, if you have any of these for sale please drop me an E-mail.

Date: Mon, 02 Jun 2003 08:47:56 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] 26A7 replacement

Here is the URL for the official solid state module. The 392 site here is absolutely excellent for anyone using or fixing an R-392. I tried building one out of some power transistors but the crossover distortion was too much. Maybe my Mark II (plan b?) design will work better if I ever get around to building it.

http://www.roveroresearch.com/r392/r392_ss_audio.gif

Date: Mon, 02 Jun 2003 11:51:57 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] R-392 connectors

Unfortunately I don't have any spare R-392 connectors, but I saw a pile at the Rochester hamfest this past weekend, both the power and audio, so they are around. In the mean time since power, audio and break in are on the same connector (diagrams on the Rovero site) you can get molex female inserts which will push over the pins very nicely, so cover them with heat shrink before you push them onto the 392 pins and you get a temporary but nice connection without any surgery on the set. (I don't get to be burned at the stake for this one ;-) I have an R-392 and its a really nice radio, but its big brother (R-390 or R-390a) is even nicer.

Date: Mon, 02 Jun 2003 9:05:43 PDT
From: "Gary Gitzen" <gfgitz55@orca.cetus.com>
Subject: [R-390] Re: 26A7 replacement

.....building one out of some power transistors.....

Looking at the 2N498 output stage, that comes as no surprise. A bit of redesign with some real forward bias on the bases should improve things significantly.

> Maybe my Mark II (plan b?) design will work better .....

Noticing that T603, the original output xfmr, is still on chassis would prompt me to create a design using FETs as outputs, possibly driven by a diff-amp or even some flavor of linear IC. That would eliminate the two xfmrs in the original design. <snip>

From: "Bruce Ussery" <wa4zlk@acer-access.com>
Subject: Re: [R-390] R-392 connectors
Date: Wed, 4 Jun 2003 21:53:16 -0700

I got a new power connector (Amphenol 164-44FS) from Fair last year. Also got a couple of used audio output connectors (U-77/U). If you want the matching mobile speaker, it's an LS-166/U, but it will sound like what you would expect a 3 1/2" waterproof speaker to sound like. If you can find a ratty LS-166/U, at least you'll have the connector which you can connect to a speaker more suitable for home use. A matching xfmr will be required for a low impedance speaker. I'm using a Hallicrafters R-46. Label says it's 500 ohms input- sounds good.

Date: Thu, 5 Jun 2003 09:10:12 -0400 (EDT)

From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] R-392 connectors

William Perry aka "The Connector Guy" has R-392 power connectors. The LS-166 has an internal matching transformer to go from 600 ohm on the R-392 to the 8 ohm on the internal speaker. I pulled the vehicle/radio switch and put a switching 1/4 jack in with a little re-wiring to let me plug in other 8 ohm speakers. They still sound like crap, so either I did something wrong (quite possible) or the transformer doesn't match very well (also quite possible). Calling an LS-166 crappy sounding is still quite charitible.

Date: Thu, 5 Jun 2003 17:36:33 -0400 (EDT)
From: "Paul H. Anderson" <pha@pdq.com>
Subject: Re: [R-390] R-392 connectors

Some folks asked how to get R-392 connectors:

William Perry Co., Inc.
702 (Rear) Beechwood Road
Louisville, Kentucky. 40207
Phone: (502) 893-8724
Fax: (502) 893-9220

I'm not sure if the street address is correct - last time I talked with him, he said something about it changing. He has lots and lots of other connectors, too.

From: "david freeman" <_dave.f@mail.com>
Date: Thu, 05 Jun 2003 20:26:53 -0500
Subject: [R-390] R-392 tubes

Do any of you have a good (read cheap) source for 26A6, 26A7, 26C6, 26D6, and 6AJ5 tubes? Guess what I just bought and it's missing almost every one of them. I thought the price was too good to be true.

From: "Jon & Valerie Oldenburg"
<jonandvalerieoldenburg@worldnet.att.net>
Subject: Re: [R-390] R-392 connectors
Date: Thu, 5 Jun 2003 22:10:57 -0500

The LS-166 will always sound poor due to the weatherproofing of the speaker. Open it up and replace the speaker if you wish to use it. A better fix is the use of a Radio-shack PA 70 volt to 8-ohm transformer and then use your speaker of choice, the Radio shack small meal cased speakers have real nice fidelity. Jon

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Date: Thu, 05 Jun 2003 20:58:54 -0700
From: Buzz <buzz@softcom.net>
Subject: Re: [R-390] R-392 tubes

I didn't look for all of them but Antique Electronic Supply at:
http://www.tubesandmore.com/ has 26A6 for $2.80 and the 26A7 for $7.55
Select tubes in the left frame.

From: "david freeman" <_dave.f@mail.com>
Date: Fri, 06 Jun 2003 16:02:05 -0500
Subject: [R-390] R-392 tubes

Thanks to all on the list for the tips, private offers, and taunts (for being cheap). Here is a list of suppliers recommended, Antique Electronic Supply seems to have the best selection and pricing on new tubes, IMO.

Antique Electronic Supply www.tubesandmore.com
Vacuum Tubes, Inc. www.vacuumtubesinc.com
Fair Radio www.fairradio.com
Radio Electric Supply www.vacuumtubes.net

From: "AI2Q" <ai2q@adelphia.net>
Date: Fri, 6 Jun 2003 21:04:27 -0400
Subject: [R-390] R-392 solid-state mixer notes

A whole bunch of folks have e-mailed me asking about my solid-state mixer
"tubes" I put in my R-392. It's been awhile since I fiddled with these, and a lot of project water has passed under the proverbial bridge since then. But, if I recall correctly, I used El Cheapo Radio Shack MPF-102 MOSFETs, or perhaps they were MPF-105 types. Also, I used Sears/Craftsman No. 25024 cutoff wheels. I mounted the Dremel motor in a vise, arranged so that the sparks fly away from you. I then rotated the tubes by hand. I think the wheel as much melts the glass as cuts it. You'll see the glass get red at the point of contact.

From: "g4gjl" <g4gjl@btopenworld.com>
Date: Sun, 8 Jun 2003 15:06:01 +0100
Subject: [R-390] R392 Condensation

When my R392 has been on for an hour or two the tuning window fogs up with internal condensation. How can that be prevented?

From: ToddRoberts2001@aol.com

Date: Sun, 8 Jun 2003 10:14:52 EDT
Subject: Re: [R-390] R392 Condensation

Open up the case while it is running and let it air out for a day or two.

Date: Sun, 08 Jun 2003 11:04:31 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R392 Condensation

You must be running it battened down - as it was designed to run. However,
that can result in heat buildup, especially if you're still using the 26A7 audio tube. Some have resorted to drilling vent holes in the case - not nice. Instead, you can loosen up the allen bolts on the front panel and slide the radio forward, leaving a gap of about 1/4", or a small handful of millimeters to allow venting of heat and humidity as it warms up. Might be a good idea to run it that way regularly to minimize heat buildup, or you can close it up after a few hours of running while it's still warm so as to seal out the humidity. If that doesn't work, you may have to leave both case and rx out in the sun on a hot dry day or use a hair dryer on it, but carefully. If it's not bolted to the back of a Jeep being driven through swamps, I recommend running it partially opened.

From: "g4gjl" <g4gjl@btopenworld.com>
Subject: Re: [R-390] R392 Condensation
Date: Sun, 8 Jun 2003 17:51:45 +0100

Thanks to all thos who replied to my question...I have had the set out of its case to replace the tuning lock, which some idiot had removed and lost previously. The replacement came from Dan (Hank) Arney.....Thanks Dan! I thouht the idea of running it up until it is hot and then casing it was a good one, and that is in fact what I did when I re-cased it yesterday....It must be more humid here than it feels, I guess! Good advice from Bill W2CQ.....Perhaps the Equatorial region should be re-named as the boatanchor belt!

Date: Sun, 8 Jun 2003 11:46:28 -0700 (PDT)
From: "Richard M. MC Clung" <wa6knw@sbcglobal.net>
Subject: [R-390] R-392 humidity

If I remember there is a hexhead plug just below the dial window eschteon centered on the front panel. If memory serves me this is a venting plug. You could also put a small bag of silica jell in the receiver to absorb any incidental humidity and of course periodically replace and recharge it.

From: "g4gjl" <g4gjl@btopenworld.com>

Subject: Re: [R-390] R-392 humidity
Date: Sun, 8 Jun 2003 20:29:17 +0100

Thanks, Rich. I will check out that plug.... I assumed it was an access port for the tuning mech! I opened the RX after the last postings to let out the wet air....I'm not sure that is the cure as the present air is probably just as wet....But the Silica Gel should nail it. Hazards of living on a fog bound island in the middle of the North Sea!!!

From: Llgpt1@aol.com
Date: Sun, 8 Jun 2003 22:07:29 EDT
Subject: [R-390] Jan 6DC6 tubes for sale

Have 5 NIB Jan Phillips ECG 6DC6 rf amp tubes for sale.
$12.00 shipped continental U.S. Les Locklear, Gulfport, Ms.

Date: Mon, 09 Jun 2003 09:35:22 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] R392 condensation

I had the same problem when I got mine and I did exactly this suggestion and it worked. Good advice from Todd.

Date: Wed, 18 Jun 2003 13:17:35 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] R392 needs work.

The R392 is hermetically sealed so the inside will likey be in pristine shape (no dessicated critters) but there's a gotcha. The R392 IF and AF modules aren't separate units! I got an AF module from Fair Radio and there's a bundle of coax that came from the IF area that was snipped. I got what I needed from it, but I couldn't use the module as a swap in. I think the whole lower deck is a unit. Thats one aspect where the 390 (any variant) is much superior.

From: "Barry Hauser" <barry@hausernet.com>
Subject: Re: [R-390] R-392 available - needs work
Date: Wed, 18 Jun 2003 13:26:22 -0400

> This lonely R-392 was just down the road from me and I couldn't resist so
it followed me home last week.

Uh-huh, I see ... The seem slick on the bottom, but really have millions of tiny caterpillar feet.

> I'm now in need of the crystal cal module, AF module and IF module, so I was told.

Whoa .. sounds like you're really short on modules there, John.

> A power and audio connector would be nice as well. It looks nice outside and has the meter!

Those are obtainable. You could haywire 3 leads to the power connector -- actually two -- filament and B+ -- are generally jumpered for +28 vdc and one is ground. Best to pick up an LS-166 matching speaker. Sound quality is not too terrific as it's waterproof and concussion resistant (not much audiophool compliance in the surround or spider), but it is plug 'n play and comes pre-assembled with the correct connector. Has a small 600 ohm matching transformer built in.

> There may be other things as well as I have not had a chance to open it up yet.

Sounds like it was an organ donor, but I'm surprised the meter survived. I'd suspect you're mising some shafts and/or shaft couplings at least -- stuff that falls loose when the module gremlin absconds with the modules.

> (it's still in the back of the car waiting for my wife to go out long enough to sneak it in)

Aahhh yessss, the old "boatanchor shuffle", I know it well. That's one of the reasons to have more than one. "Is that another one of those ugly smelly radios?!!!", "No, dear, it's the same ol' one, just hauled it out of the garage to work on it, heh heh." Fortunately, She-Who-Must-Be-Obeyed doesn't read tags and serial numbers. Actually, you need at least three of each -- one to play, one to tinker with, and another as a decoy ;-) Also, the R-392 fits pretty well in one of those "banker's boxes" with the cutout handles and the lid, though the lid won't completely close. So they can be hidden in plain sight. Mark the label area of the box with something innocuous and deceptive, like "Tax Files -- Save 100 years".

> I'd thought I'd ask here before I went to Fair Radio. Not sure when I'll get to it and it is my first R-392 so I figured it best to put out a posting to see who has what for parts

Fair may have some stuff -- and might not have a few items, depending. It's
a bit premature as you need to more completely evaluate what's missing. It
may have been more randomly cannibalized with lot's of small

unobtainiums
missing.

> as well as who here is into the R-392 to see if I can join the super secret society.

Can you do the secret handshake?

> At least I don't have to worry about an "A-nonA" thing with this radio!

Well, I dunno. Sounds like you got an R-392-(Minus) A-C-I-(?) You might get lucky, but this radio is probably like most things, the whole is cheaper than the sum of its parts. Most I've come across are intact/complete give or take a small part. Not a particularly good sign that it was an obvious organ donor. As with humans, even though they sign the back of their driver's licenses, you can't harvest any useable parts unless the prospective donor has gone SK. Good luck in your quest. Do you have a manual? If not, you can download one from several sites. Paul Rovero has some nice, informative web pages on the subject.

From: "Peter Worrall" <g4gjl@btopenworld.com>
Date: Sat, 21 Jun 2003 17:38:38 +0100
Subject: [R-390] R-392 Moisture

Thanks to all those who engaged in this one, two weeks or so ago. I re-opened the RX on a hot day and ran it for about 4 hours. Subsequently I re-closed the case and tightened all the fasteners. So far there has been no recurrence of visible moisture in the tuning window :-)

From: "Peter Worrall" <g4gjl@btopenworld.com>
Date: Sat, 21 Jun 2003 17:50:32 +0100
Subject: [R-390] R-392 Performance on Loop antenna

I have been playing with a 1 metre square loop antenna soldered up from 15mm water pipe lengths. I use a 1000pF cap to tune (it runs 2700 to 14500kc barefoot) and I add a parallel pair of 1000pF 10kV caps to take it down into top band. As the R-392 has been out to play with on the bench for a few weeks, and I am running it from a 30 vdc accumulator, I decided to try the loop on the r-392.

The performance is astonishing!

The loop delivers enough rf to overload the '392 on 4000 to 6000kc after darkness has fallen. Performance is excellent over the entire range with top band noise (a real problem here) reduced to very low levels. The directivity and the e-wave noise immunity contribute to its performance

and off set the lower signal levels it delivers to the RX load. To anyone wishing to use HF receivers in a noisy or no-antenna environment I would recommend using loops they are easy to build and most effective buck (Åí) for dB. BTW there is no hi-Z amplifier between the loop and the RX....just a screened single turn of coax and an inductive coupling link. I will take the 392 out to a rural noise free location on batteries with the loop to see what the performance under those conditions is like in the next week or two. The results will be posted later.

From: "Mark Richards" <mark.richards@massmicro.com>
Subject: RE: [R-390] R-392 Performance on Loop antenna
Date: Sat, 21 Jun 2003 14:49:45 -0400

Peter, Do you have a photo of your creation? Please consider posting it somewhere (or I will host it for you). Sounds like a neat project.

From: "Peter Worrall" <g4gjl@btopenworld.com>
Subject: Re: [R-390] R-392 Performance on Loop antenna
Date: Sun, 22 Jun 2003 12:20:22 +0100

Hi, Gregory, and thanks for your interest. You are right theat the R-392 will work on 28vdc, but the extra volt or two on the 'HT' improves sensitivity with only a minute reduction in noise factor. The R-392 Heaters are fed from a 28 volt tap on the accumulator. This is normal practice and is allowed by the Military in one of the handbooks. I charge my accumulator stack on cheap power at night and use it during the day. It also serves to power my Collins 18S-4 100Watt AM rig!

The loop consists of 3 x 1 metre lengths of pipe, joined at right angles to form a U shape.The fourth side closes the U to make a square with a gap in one side with two pieces of pipe about 0.45 metre each, again attached by right angle elbows, so there is a gap in the centre of one side. Here I mount a 1000pF airspaced variable Cap. The coupling is done in coax and consists of a 1 metre length of coax connected to a tee piece at one end, by a normally terminated coax plug.

The other end is terninated (unusually) in a coax plug, but with the inner of the coax cable connected to the outer body metalwork of its plug. This is then returned to the second socket on the tee piece. This forms a screened single turn pick up coil. I used BNC coax fittings throughout. I sweated a machine screw onto the rear of the tee piece and fixed it to a plastic pipe clip.I attached another pipe clip to the coax cable with a small plastic 'P' clip. Thus the pickup loop is supported by two points by clipping it onto the 15mm copper pipe forming the main loop. The third socket on the tee piece goes via a normal coax to the RX antenna socket. Theory says that the loop should be positioned opposite the capacitor arm of the main loop.

In practice I have found it makes no difference where it is placed, except that the antenna is easier to handle if it is placed lower down due to lower centre of gravity. I will re-test this findind in open space away from metal objects to see if the theoretical prediction holds where the field is more natural around the antenna.....need the field trip for that one!

From: tburr@dixie-net.com
Date: Mon, 30 Jun 2003 20:02:58 -0500 (CDT)
Subject: [R-390] R390, R390A, R392 VFO Question

Is the VFO of the R392 compatible with the R390/R390A VFO ?

From: "Don Reaves W5OR" <w5or@comcast.net>
Subject: RE: [R-390] R390, R390A, R392 VFO Question
Date: Mon, 30 Jun 2003 21:26:38 -0500

The tuning ranges are the same, but everything else is different.
Here is a reference to more than you probably wanted to know:

http://militaryradio.com/pto.html

From: "Scott Bauer" <odyslim@comcast.net>
Date: Thu, 17 Jul 2003 17:22:51 -0400
Subject: [R-390] Can someone help with an ols R388?

I wonder if there is anyone that can help me figure out a few things about an R388 that I bought on eBay. At least, I think it is an R388. am not even close to an expert on these things. Is is item 3033508027. The URL is:
http://cgi.ebaycom/ws/eBayISAPI.dll?ViewItem&item=3033508027&category=4673&rd=1

Here is what concerns me: the PTO is marked 70E-18. Could the cover have been replaced? My manual lists a 70E-15 for the 388, 51J and so on. The tubes there were 6JH6's I put 6BA6's back in. I brought the radio up slowly with a variac and it works. Just a little warble in the audio. Other than that it seems to be pretty sensitive. It is right on frequency. This makes me think the PTO cover is a replacement cover as I do not know if it would work with the 70E-18 in it. The front panel does not have that wrinkle finish. Did Collins paint any like that or is it a re-paint job? The radio needs some work. The good thing is that it looks to be all original and not butchered up inside. Any input on the PTO and paint?

From: "Don Reaves W5OR" <w5or@comcast.net>
Subject: RE: [R-390] Can someone help with an ols R388?
Date: Thu, 17 Jul 2003 17:28:38 -0500

The 70E-15 is the correct PTO for the R-388. 70E-18 is the 28 volt PTO for
the R-392, so they are definitely not interchangeable. As you say, covers or labels may have been exchanged. The 6JH6 could sub for a 6BA6 in an emergency. Semi-remote vs remote cutoff pentode Perhaps others on the list have tried the 6BZ6/6JH6 as subs.

As to front panel, it should be a wrinkle finish. The ebay picture looks like a flat coat of paint. Here's your link back, all restored and repaired:
http://cgi.ebay.com/ws/eBayISAPI.dll?ViewItem&item=3D3033508027&category=3D=4673&rd=3D1

Have fun with it, post your progress.

Don W5OR

Date: Fri, 18 Jul 2003 17:13:15 -0400
From: Roy Morgan <roy.morgan@nist.gov>
Subject: Re: [R-390] R-390 (R-392 parts)

>For any of those like myself who have been looking for
>28vdc pwr cable & audio cables for the R-392/URR, they
>seem to be available at: The William Perry Co. Louisville,
>KY. Telephone (502)893-8724.

More detailed info on William Perry is:

> >William Perry Company
> >92 Beechwood Rd. (Rear)
> >Louisville, KY 40207
> >502-893-8724
>No email or web site that I know of.
>
>You call him or send him a note.
>Then you wait a few days and in your mail box will show up the right
>connectors.
>Then you send him a check.. Simple.
>
>"The William Perry Company is a wholesale electronic surplus company
>located in Louisville, KY. We are a family owned and operated business
>that has been around for over 35 years. We specialize in wholesale
>electronic surplus, scrap metal, resistors, military connectors and
>commercial connectors. Connector manufacturers include: Amphenol,
>Bendix, Cannon, Burndy, Cinch and Winchester.

Available series

>types in inventory:

MS3110, MS3112, MS3116, MS3120, MS3122, >MS3126, MS3102A, MS3106A, MS3106B, MS3102E, MS3106E, MS3108E,
>PT-BT-KPT, PTSE-BTSE-KPSE, 97 A/B, CA E/R, D-SUB, STANDARD K, 17, 26, >57, 67, 165 and48 series, dust caps, bushings, cable clamps, contacts, co-axels, >strain reliefs, tools and much more!
>
>We can be reached with orders or inquiries at 502-893-8724 or fax number-
>502-893-9220. We are located at 702 Beechwood Road, Louisville, Kentucky
>40207."

Date: Fri, 18 Jul 2003 17:11:57 -0500
From: Dave Merrill <r390a@rcn.com>
Subject: Re: [R-390] R-390 (R-392 parts)

Bill Perry generally has a setup at the Hamfesters swap at the Will County Fairgrounds in Peotone, IL. This year it's Sunday August 10, 2003. In the past he's had R-392 and R-390 power connectors, assorted SCR-274N/ARC-5
connectors and many others. http://www.hamfesters.org/

Date: Fri, 18 Jul 2003 15:09:44 -0700
From: Dan Arney <hankarn@pacbell.net>
Subject: Re: [R-390] R-390 (R-392 parts)

wmperry@covad.net

Date: Tue, 4 Nov 2003 22:47:18 -0500 (EST)
From: "Paul H. Anderson" <paul@pdq.com>
Subject: [R-390] R-392 calibrator

I'm working on an R-392 where the calibrator puts out a carrier wave that
I can use the BFO to find at every 100KC, but with the BFO off, I hear no audio tone. What part of the circuit is supposed to generate the approx 1kc tone? I've heard this calibrator tone before on other R-392's.

Date: Tue, 04 Nov 2003 23:09:00 -0800
From: Dan Merz <djmerz@3-cities.com>
Subject: Re: [R-390] R-392 calibrator

Paul, my R-392 calibrator produces a tone via the bfo, and the schematics show no circuitry that indicate to me that a modulated calibrator tone is generated in the receiver. As far as I know, the only way to get a tone is

to beat the calibrator output with another rf wave such as the bfo. Now I'll
have to go down as a memory check and make sure my set works the way I described. Yes, it does - now discovered the set is not operating very well after setting for a year or so - better put that on my list to remedy. But I only got a tone when I had the bfo on and the bfo and calibrator operated ok
and as I remembered. Dan.

From: "WF2U" <wf2u@starband.net>
Subject: RE: [R-390] R-392 calibrator
Date: Wed, 5 Nov 2003 06:56:30 -0500

The calibrator generates an unmodulated carries (CW) therefore you're only
going to hear a tone when the BFO is on, or when there is a signal present, coinciding with the calibrator frequency and heterodyning with it, effectively acting as a BFO.

From: "JamesMiller" <jmiller1706@cfl.rr.com>
Subject: Re: [R-390] R-392 calibrator
Date: Wed, 5 Nov 2003 07:03:21 -0500

I have a "quirky" 390a that apparetly has some oscillator leakage somewhere. With the BFO off and the calibrator ON, I do hear a faint but definite beat note (sounds like about 500 Hz) under the calibator signal. Probably leakage from one of the other oscillators mixing in the front end or IF. It's not normal, but does happen on this particular 390 I have.

Date: Wed, 5 Nov 2003 08:05:53 -0500 (EST)
From: "Paul H. Anderson" <paul@pdq.com>
Subject: Re: [R-390] R-392 calibrator

Interesting! I have another R-392 that has a strong and clear ~1KC (could be 500Hz) signal, and I was assuming that it was "normal" and that my other R-392 with the CW signal being the broken one. I'll go back and look more carefully at the other R-392. Thanks for the feedback, guys!

From: "Bruce Ussery" <wa4zlk@acer-access.com>
Date: Tue, 20 Jan 2004 00:07:24 -0800
Subject: [R-390] R-392 microswitch

I'm trying bring this recently acquired R-392 back to life. It would work long enough to tell it's in decent shape (although the dial seems to read 10 kHz high - I may have questions about that later). But it keeps dying - dial lights and all, which I traced to the microswitch activated by a cam on the

main function switch. I've got the beast extracted, and it acts like it might be fixable if I can get into it and clean the contact. I've pried the seam with an X-acto pretty firmly but no luck yet. Was just wondering if there's a secret method, or do I just need to pry harder. Don't want to get in a hurry and trash it with no spare in sight. It seems somewhat free all the way around the seam. Is this the same switch that sticks ON on the R-390A? (Don't have one of those yet.) I'll take it to work tomorrow and look at it better under a microscope. Yikes.. it's already tomorrow...

From: "Bruce Ussery" <wa4zlk@acer-access.com>
Subject: Re: [R-390] R-392 microswitch
Date: Tue, 20 Jan 2004 12:51:05 -0800

Under a microscope the little pins (about .040 in. dia.) holding the lid on became obvious. They are flush with the body so easily missed, especially late at night with tired eyes. I pushed them further in with a sharp tool and it came right apart. The contacts looked nasty but cleaned right up. Contact resistance now reads about 10 milliohms consistently instead of many ohms. Now I just have to decide the best way to close it back up since the little pins are pushed into the body forever. And should I leave the contacts dry or maybe add a dab of Deoxit? Thanks, Bruce

----- Original Message -----=20
From: David Medley=20
To: Bruce Ussery=20
Sent: Tuesday, January 20, 2004 8:30 AM
Subject: Re: [R-390] R-392 microswitch

I have repaired a number of these from the R-390/390A radios. I assume the R392 is the same. You just have to pry harder to get the lid off. If you look carefully you will se there are a couple of studs that also hold it on. When you get it off make a careful note of where all the parts go before you disassemble it to clean it. The usual failure mode of this is "stuck on". I don't know that I have struck the mode you have but you will find out when you open it.
Good luck Dave

Date: Fri, 23 Jan 2004 10:53:28 -0800
From: Dan Merz <djmerz@3-cities.com>
Subject: Re: [R-390] Help with R-392

Ronnie, I bought a 392 years ago at a hamfest and my 392 guide led me to build a power supply using a big transformer (I think it's 21 vac output) and a 5400mfd/30volt computer grade capacitor from the junk being sold at the same hamfest. This has worked well for many years, a very simple power supply initially. I did add a relay/resistor to the circuit to reduce

the initial surge to charge the capacitor when first turning on - otherwise I had to use a variac to bring it up or it would blow the appropriate fuse that I put in the power supply. I believe it is as quiet as I need. I can provide more details if you're interested in this approach but you can probably find one already assembled - I think I may have bought a regulated one since making mine but never used it. I think mine puts out about 24 volts under load - my mentor at the time thought that was plenty - though I've read that the radio performs better with full 28 volts, Dan

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Date: Fri, 23 Jan 2004 15:21:56 -0700 (MST)
From: Richard Loken <richardlo@admin.athabascau.ca>
Subject: Re: [R-390] Help with R-392

And that might start to explain why you have to bring it up slowly or the fuse will blow!

Date: Fri, 23 Jan 2004 17:33:31 -0500
From: Jim Brannigan <jbrannig@optonline.net>
Subject: Re: [R-390] Help with R-392

Wow, for a constant load, that capacitor is waay too big. 2,000 Mfd. should
be more than enough....

From: "Drew Papanek" <drewmaster813@hotmail.com>
Subject: Re: [R-390] Help with R-392
Date: Fri, 23 Jan 2004 19:34:24 -0500

>For what it's worth, 3 amps sounds like about the right current draw. Both
>of mine draw about 2.6 amps; one fluctuates between 2.6 and 3 as the
>calibrator crystal oven cycles (I assume).

Reduction of internal temperature is of benefit to extend the components' lifetime. If 3 amps continuous there is nearly 90 watts in the (sealed) box. It sounds like the calibrator crystal oven draws about 400 mA. Additionally,
the audio output tube heater adds about 15 watts of heat with its 625 mA heater current drain. Elimination of these loads would reduce total receiver consumption to 2 amps (easier on the power supply) and eliminate 15 to 28 watts of internal heat. With the 6.3v calibrator crystal oven disconnected, my R-390A has no problem with calibrator frequency stability. That may also apply to the R-392. The constant (high) temperature provided by the oven is of use when operating the radio in

Antarctica-hardly the type of service most of our radios see. The filament heat of the audio outputube can be eliminated by a solid state repacement (blasphemy). Rovero's R-392 website shows a couple of different schemes. For the modification-averse, output tube could be removed and audio taken from one of the grids (the one driven by the cathode of the phase splitter) to be fed to an external audio amp/speaker. Simplest heat reduction would be to slide the radio out of the case a bit.

>And I gave up on AC power supplies after trying three. They all radiated RF
>noise, mostly below 8 Mhz, so I got a couple of big gel cells at a hamfest
>and a "wheelchair battery charger" through the internet.

Most abundant are switch mode power supplies. They are noted for compactness, high efficiency, light weight, low cost and high levels of RF noise. What one needs is a linear power supply. The attributes are the opposite of those listed above for SMPS's. A simple unregulated transformer-rectifier-filter type supply might suffice if it has huge filter caps for low enough ripple.

Date: Fri, 23 Jan 2004 16:50:40 -0800
From: Dan Merz <djmerz@3-cities.com>
Subject: Re: [R-390] Help with R-392

Jim, you figured it out but you forgot that the voltage will drop about 10% in
going from 54000 to 2000 mfd with 3 amp load so I'd get 22 volts instead of 24. Of course I could use a higher voltage transformer but I went with what I could find at the time, couple of bucks for the transformer and a dollar for the capacitor. I bought one spare capacitor. I was a little surprised that the guy advising me knew just what voltage I was going to end up with since he sort of casually picked the parts for me. He was a military equipment collector from Canada that I still run into at swapmeets here in WA state.

From: "Bruce Ussery" <wa4zlk@acer-access.com>
Subject: Re: [R-390] Help with R-392
Date: Fri, 23 Jan 2004 23:03:40 -0800

Good reminder about the crystal oven. I'll disconnect it soon to save those watts. I'm sure I'll never be bothered by calibrator crystal drift. As for the audio output power hog, at least the designers addressed that issue later with the solid state module shown in the manual. I wonder it these ever show up in later radios or as spares? Mine is rarely on more than 2 or 3 hours at a time, so heat isn't much of an issue. I have left it on overnight before and the case does get a bit toasty...

From: "Drew Papanek" <drewmaster813@hotmail.com>
Date: Mon, 26 Jan 2004 17:05:37 -0500
Subject: [R-390] RE: Help with R-392

With a 3 amp load and 2000 uF filter cap you'd have about 8 or 10 volts of ripple (Hummmmmmmmmm). If I recall correctly, the R-392 has 2 input pins for the 28 volt source; one supplies the heaters and t'other supplies B+. (If I recall incorrectly, maybe it could be made so with minimumodification). Some have reported improved performance by upping B+ to 35v or so while leaving filaments at 24v. If one were to go that dual power supply route, a low quality 24v supply (maybe even AC?) could heat the filaments and a well filtered supply at higher voltage could provide B+. The better filtered B+ supply would need less filter capacitance because the '392's B+ current requirement is miniscule compared to its heater current.

From: "James A. (Andy) Moorer" <jamminpower@earthlink.net>
Subject: Re: [R-390] RE: Help with R-392
Date: Mon, 26 Jan 2004 19:21:30 -0500

The filament current is about 1.5 A and the plate current is about 0.5 A. They don't need to be regulated, but any 60 Hz hum will go right into the audio. At startup, the filaments will pull up to 5A or so for a few tens of milliseconds - long enough to blow any normal fuse. I fiddled around with separating the filament and plate voltages. My conclusion is that you really shouldn't set the plate voltage over about 32 volts. It starts sounding rough and distorted above that. I pretty much ended up setting it at 30 volts and leaving it. One thing I haven't seen discussed much is the filament voltage. The radio ran on 28 volts, but most of the tubes are rated for 26 volts. They also have two 12.6V tubes in series for 25.2V. I think 28V is too high. I set the filament voltage down to 26 volts on mine. I don't notice any difference in performance.

Date: Wed, 28 Jan 2004 23:58:58 -0600
From: Tom Norris <r390a@bellsouth.net>
Subject: Re: [R-390] RE: Help with R-392

>I fiddled around with separating the filament and plate voltages. My
>conclusion is that you really shouldn't set the plate voltage over about 32
>volts. It starts sounding rough and distorted above that. I pretty much
>ended up setting it at 30 volts and leaving it.

I hit upon nearly the same combination of voltages as Andy. Since I had the
bright idea of separating my plate and filament back in '79 or so, I have

not ever had to replace a tube. I have ran my filaments at 24 volts and plate at either 30 or 32 depending on the incarnation of the power supply. Always regulated both on mine, with my filaments a little "on edge" current wise so they start up slow. Time now to get those linear power supply bricks I bought a while back into use for a R-392 power supply - will set them to the same voltage as I have been running over the years with no problem. I tell you, though, the higher plate voltage *works wonders* and doesn't seem to add any odd mixing or distortion products. Darned thing acts like a full grown R-390 with around 30 volts on plate. Never saw much in the way of a penalty for running my fils low though, probably good for a nice long life. I'm pretty sure I've not changed *any* tubes in this Western Electric unit since I got it in '79. Came with the SS audio module too. My others I have had have given me good service too, it's just a darned good rugged little RX.

Date: Mon, 27 Sep 2004 15:22:01 +0200
From: "Clemens S.Ostergaard" <clemens@it.dk>
Subject: [R-390] "New" R-392
To: R-390@mailman.qth.net

Assembled high priests of the R-39x ,

The R-392 I had been looking for for a while finally materialized last week. From another corner of Europe, namely Austria, which is no longer in the front line of a Cold War and so is able to let go of a great receiver like this. It is a fairly late contract, Philco 59, so likely made in 60-61, Marcottes list has 688 of them, and the s/n of this one is in the middle of the run. I have to say that I am very impressed. I had thought of it as a variation of the R-39x, which I somehow ought to include as a quaint relative, but should not otherwise expect too much from. In fact this particular set at least is extremely sensitive, has a very accurate readout, a great sound to a 600 ohm speaker (not LS-166 :-, but vintage Bang & Olufsen), and is easy to tune SSB on.

It is sensitive enough that on startup it received Far East stations on 2, 5 feet of wire, and later, when listening to N4KG on 80 metres, I discovered that the patch of coax that I thought was connecting to my antenna-switching, was in fact only going to the Eddystone 880 across the room! A very lively receiver thus, and yet also reasonably quiet, especially on a T2FD. The 8 kcs filter does give a better sound than its counterpart on the R-390A, and I begin to understand why people rave about the R-390(non-A) (which I have not encountered in Europe), but of course the filters do not cut like the -A.

Readout is as I say very accurate (Dubrow PTO holding out well), and I hardly need to adjust zero. It is in very good condition, even has spline

wrench, tube pullers , spare dial lamp, but not the angle screwdriver. The covers of the two audio-sockets (Amphenol 164-8, I think) and the IF out are missing. Because of the submersion-proof seal, I guess, the innards are spotless, a pleasure to behold the way a 390 has been packed into a small space seemingly without loss (apart from a lot of specialized controls) The meter has full movement, while the antenna trim is a little less easy to peak than on my trusty R-390A's.

I have Jeff's invaluable CD, including a lot of the Rovero-site and plenty manuals. Now all I need is a jeep- or a tank -, a 15 feet whip and perhaps the Arctic mittens that the strange knobs permit using! I manage quite well at the moment, but if anyone can point me to a connector for power/audio, or to covers for the other sockets , it would help beautify (I know, not the right word about an R-392) this surprising receiver.

I realize that I have probably been a bit lucky, and that it is extremely well aligned, and generally set up by professionals. Could easily become a favorite. (My SWIMBO, realizing its potential, or perhaps just jealous, suggested that I place it on permanent station in the garden to test its weatherproofing...)
Date: Mon, 27 Sep 2004 09:25:38 -0500
From: John Seboldt <k0jd-l@seboldt.net>
Subject: Re: [R-390] "New" R-392

You got more accessories than I did. Mine was missing 12xxx tubes, needed
some exercise in the switches, and still has an intemittent cutout that I need to tap the first mixer tube to fix, but basically works well - also a little break in the corner so the hermetic seal isn't perfect now, but still pristine inside. For the power connector, I put some push pins into some holes drilled in a clear piece of plexiglass, giving me power and audio out - yes, some nice original-equipment connectors would be nice.

Date: Sat, 11 Dec 2004 19:02:54 EST
From: ToddRoberts2001@aol.com
Subject: Re: [R-390] Wanted: R-392 power

Hi Don, you can try the William Perry Company, 702 (Rear) Beechwood Road, Louisville, KY 40207. (502) 893-8724 I bought several R-392 Power Connectors from him awhile back. He specializes in hard-to-find Mil connectors at reasonable prices. You can leave a message on his phone describing what you want and he will get back to you. 73 Todd WD4NGG

Date: Sat, 11 Dec 2004 22:41:22 EST
From: ToddRoberts2001@aol.com

Subject: Re: [R-390] Wanted: R-392 power

The Power Connector for the R-392 is a nine-contact, screw-locking female plug, Amphenol type 164-4FS

Date: Thu, 27 Jan 2005 10:41:07 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: [R-390] OT:DC Power Supply for R-392

I recently bought a fair R-392 (it will be on the ship on somewher in Pacific Ocean yet). But I don't have any 28VDC power supply. I know it draws around 3 amps at 25 to 30VDC but it's really hard to find a good used 28VDC PS in Japan. However, there are considerable number of 24VDC PS's with over 4 or 5 max amps available on used market. So, I'd like you guys to give your advice on whether it can be run at 24VDC.

Date: Wed, 26 Jan 2005 20:58:37 -0500
From: "Dave Maples" <dsmaples@comcast.net>
Subject: RE: [R-390] OT:DC Power Supply for R-392

Osamu: I don't think it would be any issue at all. As I recall, the R-392 that I had worked just fine at 24 VDC. That's been several years ago, though. If you are really concerned, you could always use two 14 VDC power supplies in series. I suspect the outputs are floating relative to ground, so I think you'd be OK there; however, I really don't think you will need to go to the trouble.

Date: Wed, 26 Jan 2005 22:24:12 -0500
From: "James A. (Andy) Moorer" <jamminpower@earthlink.net>
Subject: Re: [R-390] OT:DC Power Supply for R-392

It does run fine at 24 volts. In fact, the 28-volts is too high for the filaments in this receiver. They were designed for 26 volts, not 28. They work fine at 24 volts. On the power connector, there is a separate pin for the filament supply and for the plate supply. The plate supply actually works better at around 30 volts. At 32 volts, it starts sounding distorted. What you might do is to put 24 volts into the filament pin, then add a small 6-volt supply to that to get the 30-volt plate. The plate circuit only draws a few hundred milliamps, so the 6-volt supply doesn't have to be very powerful. Note that you should avoid switching power supplies - they make so much RFI that they will swamp the signals you are trying to receive.

Date: Fri, 28 Jan 2005 13:48:54 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: [R-390] Connectors for R-392

Thanks everyone who adivised me of PS for R-392. I decided to buy a good used (and inexpensive)24VDC PS for R-392 on the way. But I failed to locate any resource for power connector and audio connector. In the manual, it says Amphenol 164-4FS for the DC power but I haven't find it so far. Does anybody know of source of power/audio connectors for R-392?

Date: Thu, 27 Jan 2005 23:14:33 -0800
From: "Dan Merz" <djmerz@3-cities.com>
Subject: Re: [R-390] Connectors for R-392

Hi, when I bought the power connector, I got it from Fair Radio, but about 10 years ago. They may still have some. The audio connector was on the appropriate speaker. I think these are more available than the power connectors. I got one speaker from Fair and another at a swapmeet. I've seen the speakers/connector on the eplace occasionally and they show up in the Fair listing about a year ago for $18. Dan

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Date: Fri, 28 Jan 2005 08:54:47 -0500
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] Re: connectors for R-392

The best substitute for a real R-392 connector is a set of Molex socket pins that slip over the pins of the power connector. Cover with heat shrink and they look nice. I believe that the audio is in there too, but not a ground. Here I used one of the screws near by. No blacksmithing here - easily reversible.

Date: Fri, 28 Jan 2005 09:26:20 EST
From: ToddRoberts2001@aol.com
Subject: Re: [R-390] Connectors for R-392

For R-392 Connectors try the William Perry Co.
702 (Rear) Beechwood Road
Loiusville, KY 40207
(502) 893-8724

Mr. Perry specializes in hard-to-find military connectors. I bought 2 R-392
connectors from him and his prices are very reasonable.

Date: Fri, 28 Jan 2005 15:16:47 +0000
From: jonandvalerieoldenburg@att.net (Jon Oldenburg)
Subject: Re: [R-390] Connectors for R-392

Try William Perry Co (502)893-8724. He had them for about $18.00. He's a real class act. If he has what you need he'll ship it imediatly with a billing invoice enclosed even if has never dealt with you before.

Date: Sat, 29 Jan 2005 22:37:55 -0600
From: John Seboldt <k0jd-l@seboldt.net>
Subject: Re: [R-390] Re: connectors for R-392

I started with this... and then I saw a little round circle of thick clear acrylic on my desk (had been cut out with a hole saw), and a light went on... a few holes drilled in that, stick the pins on through the holes, solder on some #14 wire, a little epoxy dab, tape it up until it sets, and there it is, a removable connector! I run clip leads to it now, but a little more soldering and it would probably be a good permanent one. It's on my rig's picture at http://www.seboldt.net/k0jd/station.html (scroll down for the R392 pic)

Date: Sun, 12 Jun 2005 16:54:45 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: [R-390] R-392 Power Connector
To: <R-390@mailman.qth.net>

I'm still thinking about how to do with the power connector (164-4FS). A source ask me $30 for the connector, so "making" the connector by myself would be the best. If so, what receptacle contacts would suit for the pins? I recall someone advised it before but I lost it after I drunk some shots of "Wild Turkey"(Rare Breed) :-)

Date: Sun, 12 Jun 2005 12:16:21 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R-392 Power Connector

There are two types of crimp-on connectors I've used and a possible third. One type is a "butt" connector. This is the kind that is used to splice two wires together. You crimp the wire side and slip on the other. They usually come with insulation which extends beyond the metal. The receiver side needs to have that trimmed. At first it will be loose, so you use the crimpers to make it a little smaller and test-fit until it is snug enough. The insulation on the butt connector prevents shorting to the other pins in the R-392 panel connector.

The second kind is a round "snap" connector that comes in male and female, often used in automotive installations. The male version has a taper to it -- a narrow spot that snaps and holds in the female one. They usually have blue or yellow transparent insulation. You'd need the female.

I haven't tried this, but you might also be able to use modified "Molex" connectors. These are the nylon multi connectors also used in automotive applications, but most familiar as the 4-conductor versions used in computers to supply power to the hard drives, CD-Rom drives, etc. If you have some of these around, you can try cutting them lengthwise to separate them into individual units. You can also pick up two-conductor Molex connectors and, it might be that the spacing will allow connection to two of the pins in the R-392 jack. Or you can remove the metal terminals inside (they float around a bit), solder them onto the supply leads and use heat shrink tubing to insulate them.

First step is to look around in your junk box.

Of course, another approach is to use alligator clips with the insulating boots, making sure that the boots are pushed forward. Then use tape to keep them from accidentally getting pulled off. This is the messiest. You'll probably want to go for the connector eventually to keep things solid and professional looking. Have you checked with William Perry? His prices are supposed to be reasonable, but it could be expensive with the shipping to Japan.

To make things clearer, here are the links to the terminal types on the Radio Shack web site

Butt connectors:
http://www.radioshack.com/product.asp?catalog%5Fname=CTLG&product%5Fid=64-3037

These are the round crimp on terminals:
http://www.radioshack.com/product.asp?catalog%5Fname=CTLG&product%5Fid=64-3086

Here is a two conductor female "molex" -- Radio Shack calls them "interlocking" connectors:
http://www.radioshack.com/product.asp?catalog%5Fname=CTLG&product%5Fid=274-154

You probably have other electronics stores that carry these. Probably all are also carried by auto parts stores. If you have one of those Check the diameter of the R-392 power connector pins.

Sometimes you can find a plastic bottle cap that will fit over the outside of a mil connector -- maybe even a green one ;-). Then you can use that to provide a finished look to it. Of course, if you're concerned about that, even after the creativity, you'll probably go and order that $30 connector. Hope this helps

Barry

Date: Sun, 12 Jun 2005 14:58:15 -0400
From: shoppa_r390a@trailing-edge.com (Tim Shoppa)
Subject: Re: [R-390] R-392 Power Connector
> You can also pick up two-conductor Molex connectors

In fact they're available in single-conductor connectors too. e.g. Molex 03-06-1011 for a single-conductor 0.062" housing and Molex 03-09-1011 for a single-conductor 0.092" housing. I've only ever used the single-conductor ones for a quick-try at hooking up to random unavailable connectors.

Date: Mon, 13 Jun 2005 11:41:13 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: Re: [R-390] R-392 Power Connector

Thanks for the detailed and comprehensive explanation. Actually, I have some "Quick Disconnects" connectors in my junk box, and I was going to use them. But alas, they are naked, without any insulation. So heat shrinkable tubing work is needed (I hate it!). So, as Barry advised me, I'll try "Butt Splices/Connectors" or "Fully Insulated Quick Disconnects". Any DIY stores might have them. Yes, after I confirmed that the R-392 is up and running, I eventually have to buy "that" connector for safety purpose and a finished look.

Date: Sun, 12 Jun 2005 23:07:16 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R-392 Power Connector

Some follow-up -- see my comments:

> Actually, I have some "Quick Disconnects" connectors <snip>

Well, the good news is that you can solder them. If you don't want to use heat-shrink, you can "borrow" the insulation from some heavy wire and stretch it over the connector and lead. I have also resorted to using pieces of plastic soda straw. Regular ones might be too large in diameter, but the small ones that come glued to the side of those small drink cartons or the "little milk" cartons that don't have to be refrigerated -- might be the right size. Of course, I don't know the dialectric/insulating properties of polyethylene soda straws, but ... you can also coat the connectors with silicone sealer which is flexibile when it cures so will expand with the connector. Also very tough.

> So, as Barry advised me, I'll try "Butt Splices/Connectors" <snip>

Yes, they're pretty common.

> Yes, after I confirmed that the R-392 is up and running, <snip>

Couple of other things. Probably just as important as the connections themselves is to provide some kind of strain relief. Loop the power supply wires below the connector and use a nylon wire tie or wire clamp (no doubt they are in your junk drawer/box, left over when you bought a packet of five and had 3 left over. ;-) What you want to avoid any chance of is snagging the supply cable and causing it to pull off the R-392 and possibly shorting your power supply. I forgot the exact pinout on the R-392 for the DC supply -- nominal 24 volts (24 v. vehicular power is just under 28 when the engine is running fast enough). There are three relevant connections: A single ground and two 28 v inputs -- one for filament and one for B+. The usual practice is to strap the two together -- usually at the p/s end of the supply cable. However, it has been written that the R-392 is optimized with something higher than 28 on the B+ -- like 32 vdc as I recall, however the filaments are best run at no more than 24 to maximize tube life. It may not be worth the bother to build a special P/S or use two supplies, but you can run the R-392 at 24 with somewhat reduced performance while being more gentle on the tubes. I think I have conveyed this accurately. If I'm wrong, someone please correct me.
Barry

Date: Mon, 13 Jun 2005 00:12:16 -0600
From: "Kenneth Arthur Crips" <CRIPS01@MSN.COM>
Subject: Re: [R-390] R-392 Power Connector

For sealing wire splices I prefer the adhesive/sealant called Seal-All. It has advantages over some silicone adhesive/sealants one of which is some silicone compounds are corrosive while curing. You can tell if it is by smelling it. If it have a vinegary smell then it is corrosive. Seal-All is far more useful in many areas. One of the uses I put it to in repair the plastic forms used in old open air induction coils. As you all know the plastic on these old coils gets very brittle and in many cases in already broken Seal-All does a fantastic job of fixing these. This stuff dries harder then silicone but it is still flexible. Seal-All can be purchase at any hardware store, Automotive parts store etc.

Date: Mon, 13 Jun 2005 08:12:35 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: Re: [R-390] R-392 Power Connector

I used Molex female plug inserts with heat shrink tubing. Worked and looked

great. The audio is on the bottom connector too, so absolutely no blacksmithing is required.

Date: Tue, 14 Jun 2005 08:26:24 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: Re: [R-390] R-392 Power Connector

I'm surprised at your plentiful ideas!

>you can solder them. If you don't want to use heat-shrink, <snip>

If I failed to make decent connection, I'll follow your idea (soldering).

>P....provide some kind of strain relief

Yes. "Experiment" sometimes converted into "Permanent Fix" ;-)

>you can run the R-392 at 24 .....

24VDC power supply that I got from an auction is 24VDC version. So it won't whip the tubes. But I'll try to boost up to variable limit (25 or 26?) whether the perfomance changes or not.

Date: Tue, 14 Jun 2005 11:20:13 -0400
From: Roy Morgan <roy.morgan@nist.gov>
Subject: Re: [R-390] R-392 Power Connector

The filament and plate connections at the power connector are separate (if I remember correctly). So, you can increase the output of your supply to 27.5 or 28 volts and apply this to the plate supply. Then put some silicon diodes in series from there to the filament supply to drop the filament voltage down to the correct amount for the tubes for best tube life. Make the diodes big enough to carry the filament current, whatever that is. Figure 0.7 volts per diode.. using four as a test would be a good start.

Date: Thu, 16 Jun 2005 09:25:25 +0900
From: "Osamu Hazawa" <pomerol@mocha.ocn.ne.jp>
Subject: Re: [R-390] R-392 Power Connector

Sorry for the late reply. And thanks for your useful advice. I appreciate it. Dropping down the voltage for filaments using only one power supply is surely a good idea. However, it was a bit difficult to find a good and less expensive power supply outputs over 24V at an auction. Acutually, there are bunch of 30VDC power supplies but their price tends to soar (I got the PS for just $9). Anyway, I'll supply maximum voltage for the plates as far

as I can and 24V for the filaments using several diodes.

Date: Mon, 20 Jun 2005 12:17:34 -0400
From: "Tim Shoppa" <tshoppa@wmata.com>
Subject: Re: [R-390] Knobs (was: no subject)

> Need a tuning knob for a r-392.

Fair Radio still has big knobs for the R-392. See
http://www.fairradio.com/hfrece.htm.

> Is this the correct place to ask?

Conceptually yes :-). And as long as I have everyone's attention: the shaft into a R-390A tuning knob is 5/16", right?

Date: Mon, 20 Jun 2005 15:38:34 -0600
From: "Kenneth" <crips01@msn.com>
Subject: RE: [R-390] Knobs (was: no subject)

I would suggest give Fair Radio a call. They have some parts for the R392 they may just have knobs as well. They do have a 24 volt switching power supply that will power the R392.

Date: Sat, 08 Oct 2005 08:40:08 -0400
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: [R-390] R-392 help

This is a little off subject, but I just procured an R-392/URR from a little old lady in Pasadena (O.K., she is not that old, and she is from Tucson). Designed by Collins between the R-390 and R-390A, it has much more in common with the R-390 than the A. The major differences are a different tube set, a fixed squelch level (you adjust it using the RF Gain control), and the lack of the 16 kc, 1 kc, and 0.1 kc bandwidths. It also is powered by 28VDC without using a dynamotor or vibrator power supply. This means that the B+ voltage is 28 VDC!

It came advertised as working, but did not when I first hooked it up. But after plenty of knob-twisting (I Looooove twisting knobs), the switches cleaned themselves enough to get working. With one caveat. When I switch to the CAL position, the thing cals up nice. Switching back, however, the receiver is almost dead for about fifteen minutes, then slowly regains its sensitivity. Note that I live near two strong AM stations that put better than 10 millivolts into the receiver. And there is no loss of sensitivity when tuning across them. Also note that switching to Standby, then back into Normal does not cause the problem (eliminating the

antenna relay).

Have not started troubleshooting it yet. Anybody have any ideas? And are there any other R-392 owners out there to swap knowledge with?

By the way, she is horrified that it did not work when I got it, and is grateful that I am soooÅc understanding about it. But it came with the power connector, all the tools and tube pullers still inside, origional audio output tube, and an original manual. And with the exception of more than a few scuffs on the case, remarkably clean! She just.doesn't.get.it!

P.S. Anybody have an LS-166/U speaker with origional connector they are
willing to part with?

Date: Sat, 08 Oct 2005 10:18:30 -0400
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R-392 help

R-392 is fair game on this list -- part of the '390 series. We even entertain R-388's on special occasions ;-)

> It also is powered by 28VDC without using a dynamotor or vibrator power
> supply. This means that the B+ voltage is 28 VDC!

That's right -- we don' need no steenking dynomotors, hombre. Actually that's nominal 24 volt vehicular which runs close to 28 when the engine is running and revving. With a 12 volt system, it can range from 12v to max charging voltage of about 13.6, so double in a 24 volt system. The tube filaments are 26 volts nominally. There are two separate pins for the supply voltage - one for B+ and one for filament. They are usually strapped together, or the power cord might have 3 or more leads with separate connections whereby they can be spliced together or not. I've heard that some use two supplies with 24 v on the filament and around 30 on the B+ -- supposed to optimize performance while going easy on the tubes.

>It came advertised as working, but did not when I first hooked it up. But
> after plenty of knob-twisting (I Looooove twisting knobs), the switches
> cleaned themselves enough to get working.

Actually, that counts as "working" as you're expected to twist some knobs to
work it. A lot of my acquisitions arrive in that state.

>With one caveat. When I switch to the CAL position, the thing cals up

nice.
>Switching back, however, the receiver is almost dead for about fifteen
>minutes, then slowly regains its sensitivity.

Hmmmm ... you need to download some manuals and study up on it. There are several '392 manuals on the bama site. The 200 KC crystal is in a plug-in oven. You can try pulling it and switching to see if the oven has anything to do with it, but I doubt it. When you switch to Cal on the AGC switch, among other things, it cuts out the AGC, grounds it or whatever. You might have a leaky cap or a bad tube (gassy/grid emissions, etc.) in the AGC or related ciruits.

>Note that I live near two strong AM stations that put better than 10 millivolts into the receiver. And there is no loss of sensitivity when tuning across them. Also note that switching to Standby, then back into Normal does not cause the problem (eliminating the antenna relay).

Check out the manuals where they describe the calibrator/AGC etc.

> Have not started troubleshooting it yet. Anybody have any ideas? And are
> there any other R-392 owners out there to swap knowledge with?

Many of us also have R-392's. I'm sure someone else will pop in. IMHO, the
'392 is one of the more neglected, unsung units going. The thing is, they tend to work on deliver -- after a fashion -- often well enough that it does not stimulate the usual tweaking and tinkering. Also, they're small and humble and can hide under a bench or at the bottom of a closet for eons. I have several of them -- including one that was totally solid-stated. More out of curiousity than need, I did a full alignment on one of the stock units (not the solid state one). Quite an improvement -- and resulting performance was close to that of an R-390/R-390A. You should check out Josh Rovero's web pages on the '392. Search under "rovero R-392".
>
> By the way, she is horrified that it did not work when I got it, and is
> grateful that I am soooÅc understanding about it. But it came with the
> power connector, all the tools and tube pullers still inside, original
> audio output tube, and an original manual. And with the exception of more
> than a few scuffs on the case, remarkably clean! She just.doesn't.get.it!

Lucky fellow -- tools and tube pullers are @RARE@

> P.S. Anybody have an LS-166/U speaker with origional connector they are

> willing to part with?

Looks like Fair doesn't have 'em anymore. They tend to turn up on you-know-where from time to time.

Date: Sat, 08 Oct 2005 16:48:35 -0400
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: Re: [R-390] R-392 help

That was my first thought, too. That is why I tried Stand-By. I think Barry is right. Sounds like an AGC problem. I also own an R-390A from 1955, Origional Collins #2792. And if anybody has a spare PTO they want to part with, I am buying. (the origional one has about a khz of 'slip' from wear). As for the LS-166. I actually need the UG-77 connector on it. As a point of note about the tinny sound. Researched this while stationed in Korea for the RATT Rig operators, who liked to tune in shortwave on the secondary receiver. They couldn't use stereo speakers because 2nd LT 'Crash' Rothman objected to the 'Unauthorized Equipment'. The little 600 to 8 ohm transformer is the main culprit. Manually swept it using an audio oscillator and there is a nice rolloff below 300 hz. Cured the problem by replacing the transformer with a 70.7 volt one, and stuffing the metal cabinet with fiberglass. The ops were appreciative. Said it sounded a lot better. And 2nd LT 'Crash' Rothman was none the wiser. R-392/URR, Stewart-Warner, Sn# 2681R, Order nr. 11653-PH-52. And from the paint on the case, belonged last to the Radio PLT, Co B, 198 Sig.

By the way, has anyone else noticed how Collins slips these little things into their designs. Like the seperate B+ pin on the Power connector of the R-392? One would 'almost' think that somebody was thinking about making the R-392 capable of running AC for the filaments and separate DC B+ for fixed operation. Has anybody tried that? Note, It does not have the solid-state audio module. Can't think why it would not work. My little 4Amp open frame linear power supply gets mighty warm powering all those filaments!

Date: Sun, 09 Oct 2005 11:23:49 -0500
From: John Seboldt K0JD <k0jd-l@seboldt.net>
Subject: Re: [R-390] R-392 help

Hey, the R-392 is the only reason I'm on this list :-) ... I was always interested in the R-390 family, but the R-392 showed up cheap. And, as others have said, it seems to have less to go wrong with it, probably being a vehicular rig. You definitely want to run it at about 24.5 volts for filament life, according to a source I heard from when I first got it - makes sense. I had the same experience you did, where a little switch exercise got it back to life. I do have one nice quirk - the thing can go dead, but tapping

the chassis near one of the top deck tubes brings it right back. Haven't dug inside to find the problem, since it's so easy to pop the thing out and tap... the time may come when I will have to, though. Nice sound with the wide LC filter bandwidths... someday may try tapping the IF into something external, but it has a nice feel to it just the way it is. Certainly not a rig for a crowded band!

Date: Sun, 9 Oct 2005 12:24:51 EDT
From: Flowertime01@wmconnect.com
Subject: Re: [R-390] R-392 help

The R-392/URR was a mobile receiver. It mounted in military vehicles and was powered off the vehicle generator / alternator and battery. Most military
vehicles are 24 volts systems. Like today's vehicles have 13.8 volt 12 volt systems. Military vehicles have 27.6 volt 24 volt systems. Two 12 volt batteries are run in series. Most were in como vans "communication vans" likely 4 receivers and two transmitters. They likely had RTTY machines. You likely were "assigned" a set of operating frequencies so you were not "scanning" the bands looking for signals. Some were used with tank units for AM voice. I do not know if the R392 went in the tanks or if they were only used at the "command" end of the links. The R390 design was best receiver sensitivety of the era. It was "copied" over to the follow on receiver models. Moving core inductors even became popular in auto radios of the 50's. Collins pioneered single side band voice for aviation and that created a whole new line of transceivers and fixed frequency "channels" which is where communications is at today. The R390 R392 R390A were the last of the "band cruiser" receivers. I cannot imagine tuning the ham bands with an R1051 by flipping the 10KC step knob. I hope you can put up a good stiff 24 -28 volt power supply and get your R392 back into daily operation. Roger KC6TRU

Date: Sun, 9 Oct 2005 12:40:52 EDT
From: Flowertime01@wmconnect.com
Subject: Re: [R-390] R-392 help

John Bunting wrote, By the way, has anyone else noticed how Collins slips these little things into their designs. Like the separate B+ pin on the Power connector of the R-392? One would 'almost' think that somebody was thinking about making the R-392 capable of running AC for the filaments and separate DC B+ for fixed operation. Has anybody tried that?

John, My late 1920s 6 volt Gurnow has separate conductors for the filaments and the B+ lines. In the military models you could run an extra "line filter" on the B+ line for less generator noise when the engine was running. The filaments were by the 1950s isolated from the cathodes so

some noise on the filament voltage line was "OK". Some time the good battery was run on the filaments to give good current and the weak battery was run on the plate line that usually draws less total current. There are lots of reasons to support multiple power conductors between the power source and load. Roger KC6TRU

Date: Sun, 09 Oct 2005 16:38:23 -0400
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: Re: [R-390] R-392 help

Sounds like a cold solder joint. The business I work for manufactures electronics boxes for the military. When Dave pulled the case off to look inside, we all went 'EEEUUU...' at the solder joints. Don't know what the Mil-Spec was back then, but it never should have made it past the Inspector with all that rosin still on the joints.

Right now, I am powering it from an open-frame Linear Power Supply brick
rated for 28V@4A, left over from the C-17 Simulator Program and floating around the back of more than a few cabinets for the last 15 years. Too valuable to throw away, but never quite needed. The surge current triggers the current limit (surge is about 8 amps). But it pulls about 2.3 to 2.8 amps depending on the position of the lamp switch and the ovens. Gets up to a toasty 30 degrees C above ambient. (about 55C.). Well within rating, but don't touch it. When I order the UG-77 audio connectors from Fair, I'll also order a 25.2 Volt 11A transformer to feed the filaments. Then use an ST LM317 and a 28 Volt transformer to supply 30-35 Volts to the B+. Looking at the schematic, I don't see anything the higher B+ should hurt. And it should provide a bit more dynamic range. Does that sound about right?

Date: Sun, 9 Oct 2005 18:27:13 -0500
From: Tom Norris <r390a@bellsouth.net>
Subject: Re: [R-390] R-392 help

I've done so for ages. I've kept the filaments down at 24 volts so they'll last longer, then put 30 volts on the plates. Works well for me. I'd not go over 32 volts since there are 35 volt caps in there.

Date: Mon, 10 Oct 2005 20:36:41 -0400
From: "John Bunting" <john@gumlog.net>
Subject: [R-390] R-392

I've been doing some work on my R392 and would like a couple of questions
answered before I button it up. The work has been setting the end points

and
attempting to reduce the spread of zero settings from aging crystals. When
I first started, I had 18 bands < +/- 1KC, 10 bands < +/- 2KC & 4 bands < +/-3KC. After 5 runs and changing two 1st xtal osc crystals and six 2nd xtal osc crystals, it's now 25 bands < +/- 1KC, 6 bands < +/- 2KC & 1 band < +/- 3KC. Even though I had a complete set of spare crystals, not all the spares were better than the ones in the radio. This is as far as I care to go with this, as I don't want to be looking for more crystals. The spares I had were a lucky find for a very good price at a past Shelby Hamfest.

My first question came up while checking the IF alignment. I had a scope looking into the IF output cathode follower while doing the alignment. I noticed the carrier waveform was a perfect sinewave until the input signal was increased and then the bottoms of the waveform started to flatten out and ultimately looked like the output of a halfwave rectifier. Checking the wave form ay the plate of the AGC IF tube, showed a perfect sinewave, right at the point it feeds the grid of the cathode follower as well as the two AGC rectifiers. After alignment the signal level at the ant connecter had to be less than 4uv to have the signal "look normal". The AGC action seems normal, as at a signal input level of 10K uv the audio product sounded good with the RF Gain control fully clockwise. Can any one give me any idea if this is normal or if there is a trouble in the receiver that I have not found?

Second question is: I have four packages of Silica-Gel, two cloth ones with 15 grams each and two larger paper ones with about one ounce each. I've heard about putting them in a cookie tin or something and low temperature
baking them for ?? hours before putting them inside a case such as the R392
has. Mine used to have condensation in it when I would turn it on in my cold shop. I thought that these packages of desiccant tied on to the VFO case would probably absorb and remaining moisture and do away with the internally fogged up dial windows. Does that sound reasonable and could I use a small toaster oven instead of the large oven in our range? and how long and at what temperature? TIA, John, W4NET

Date: Mon, 10 Oct 2005 21:15:12 -0400
From: "James A. (Andy) Moorer" <jamminpower@earthlink.net>
Subject: Re: [R-390] R-392

The cathode follower for the IF output on the R-392 is very poorly designed. The waveform is essentially saturated on one side - it is quite ugly and has lots of harmonics. This waveform is not used internally - it is only for external SSB converters. It does tolerably well for that. Unless

you plan to use your IF output for, say, a Sherwood detector, just ignore it. If you have to have a pretty sinusoid, you will have to redesign that stage, probably using transistors instead of the tube. I haven't tried to do this yet, but it looks straightforward (if you have done circuit design before).

Date: Tue, 11 Oct 2005 14:33:12 -0400
From: "John Bunting" <john@gumlog.net>
Subject: Re: [R-390] R-392

Thanks for the reply, I sure don't want to do any design work on this classic. Just was bugged about that clipped negative waveform. Won't worry about it any longer as I do not have any legitimate need to use that IF output jack.

Date: Tue, 11 Oct 2005 11:44:27 -0400
From: Roy Morgan <roy.morgan@nist.gov>
Subject: Re: [R-390] R-392

(This is based on limited experience with silica gel): A dried out pack of silica gel will absorb maybe one third it's weight in water. It's unlikely that an R-392 contains more than an ounce or two of water in the air inside, even if warm and saturated. But:

1) If you dry out your silaca gel packs, weight them, put them back in the radio and the weight goes up by maybe a third or half, then they can't glom any more water. ("Glom" is a technical term used by a jeweler while we were an buying engagement ring about a year ago: "Don't glom the stone!" I was sternly advised.)

2) If the radio shows condensation inside the window, especially upon cooling, then there's moisture inside there. Good idea to get it out. Though I don't own an R-392 (yet), here is my suggested procedure:

- wait till a dry day arrives
- Run the radio till quite warm, and crack the case so it ventilates.
- close the case nicely to keep the dry air inside.

3) If (when) I have an R-392, I will tuck inside there somewhere an 8-ounce
pack of silica gel from among the few I've collected. (They were found in helicopter transmission and engine packing cans during my time in the Navy.) I'm assuming that room for such a pack can be found in there somewhere. About the size of a large pack of M and M's.

4) To de-water, place in any oven, kitchen- or toaster- at 220 to 250 (low to medium "WARM" on the dial) for a couple hours.. then allow to cool off with the oven. If you weigh your packs before and after de-watering, you

will know how much water they can absorb.

> I've heard about putting them in a cookie tin or something and low
> temperature baking them for ??

The cookie tin won't keep in much moisture with heat but I would not put them in any tin.. just in the oven. You are baking the water OUT, not trying to keep it in. Plastic bags, maybe two layers, server as storage after drying.

Date: Tue, 11 Oct 2005 14:43:56 -0400
From: "John Bunting" <john@gumlog.net>
Subject: Re: [R-390] R-392

Thanks for the good information. I have a small postal scale that I use to weigh ink cartridges that I'll use. It has 1/2 Oz calibrations and I can interpolate between those for a better idea of the before and after weights. The R-392 has a nice vent hole in the front panel just below the center of the dial window assembly. The plug has a neoprene "O" ring around it and I used it to get excess moisture out after a 48hour run early on. I've always figured that was what it was intended for. The size of the hole looks to be around 1/4".

Date: Tue, 11 Oct 2005 17:13:37 -0400
From: Gord Hayward <ghayward@uoguelph.ca>
Subject: [R-390] R-392 Cathode Follower

I had the same problem and fixed it somewhat with an op-amp. The circuit I built plugged in so there was NO blacksmithing involved.I don't have to be burned at the stake for this one.Its posted on Josh Rovero's site.

Date: Thu, 13 Oct 2005 21:20:44 -0400
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: Re: [R-390] R-392 help

Change 1; Just got my hands on an old LS-166/U speaker. I repeated my experiment with the low frequency cutoff of the 600 ohm to 8 ohm transformer. Either I mis-remembered, or they changed the transformer design. It swept 3dB down at 4 Hz to 0dB down from 10 Hz to greater than 200kHz! Noted a few peaks and troughs less then 3 dB from the speaker load. as I swept it. I did note that it sounds quite as tinny as I remembered. But the speaker itself is entirely different from what I remembered. So changing the transformer won't work on the LS-166/U for bettter lows. At least not without changing the speaker itself. Cabinet size probably has something to do with it, but the sound does not change with the back off. Can't do an audio sweep because the Sound Level Meter

brought the farm many moons ago. Sorry about the bum steer.

Date: Fri, 14 Oct 2005 09:43:37 -0400
From: Roy Morgan <roy.morgan@nist.gov>
Subject: Re: [R-390] R-392 help

When I read your first post about how you helped the "RATT Rig operators,
who liked to tune in shortwave on the secondary receiver", I imagined the 19-inch rack mount two-speaker thing. In one version this is known as the
LS-206A/U. The main compartment of this thing is divided into to parts, each with a transformer and speaker and each side about 8" high by 9" wide by 9" deep. To refresh my memory, I found a picture of an LS-166/U speaker. It's about four inches square by 2-1/2 inches deep and has a big mounting bolt on one side face and a switch and cord on another side face. (I presume the switch cuts the transformer in and out.)

> I repeated my experiment with the low frequency cutoff of the 600 ohm
> to 8 ohm transformer. Either I mis-remembered, or they changed the
> transformer design.

My guess is that your memory is more consistent than the equipment performance compared among the many, many contracts the LS-166 was purchased with. The LS-166 was meant for ruggedness and dependability under "field" conditions. "Holy Precipitation, Sarge, Is it EVER gonna stop raining? We ain't seen the sun since Spring."

> It swept 3dB down at 4 Hz to 0dB down from 10 Hz to greater than
> 200kHz! Noted a few peaks and troughs less then 3 dB from the speaker load.

What is it you were measuring? The acoustic output? The input impedance? It seems unlikely that something 4 inches square would produce sound across a range extending to 10 Hz. And I would not expect its input impedance to be very constant, either, unless there is lots of loss in the system as a whole (which is quite possible).

>... changing the transformer won't work on the LS-166/U for bettter
>lows. At least not without changing the speaker itself.

If the LS-166 produces acoustic power more or less level down to 300 Hz, I'd not be too surprised. Much below that would surprise me a lot. By "changing the speaker" do you mean replacing the whole thing, speaker driver, transformer, case and all? If I had to get more lows out of an LS-166, I'd scrap the case and transformer and build a completely new

enclosure, likely of the bass reflex sort, and it might wind up as big as the LS-206. I would expect to then figure out that the driver is completely wrong for the job.

>Cabinet size probibily has something to do with it, but the sound does not >change with the back off.

Yes, indeed! I think the case on those I've seen is not very "sealed" - that is closed from air leakage from the action of the driver. However, the water sealing on the thing may actually do a good job of acoustic sealing also. Even if it were well sealed, there is not enough volume of air inside the thing to make it work well at lower frequencies. It is very interesting to put a moderately well sealed back on our boatanchor speakers, such as the older Hallicrafters and black Collins ones, and then in addition, stuff the now-closable box with absorbing material. It's also very interesting to compare normal radio type speakers to even modest "hi-fi" type speakers.

Date: Sat, 15 Oct 2005 20:13:03 -0400
From: "Ian Gallimore" <iangallimore@rogers.com>
Subject: Re: [R-390] R-392 help - Green Speaker-ology

For what it's worth, I picked up a Hammond 119 DA transformer today, wired a
U-77 connector to its 600 ohm primary, and connected a small 8 ohm bass reflex speaker I had kicking around. Much better sound from my R-392 than from the LS-166. Volume not huge, but quite useable. I think the Collins Collectors group was instrumental in getting Hammond to produce this transformer. Does anyone have any information on this last comment? If someone has a folded horn speaker, like one of the old Klipsch horns, which I understand are very efficient, volume might be even better.

Date: Sun, 16 Oct 2005 16:21:06 -0500
From: John Seboldt KOJD <kOjd-l@seboldt.net>
Subject: Re: [R-390] R-392

James A. (Andy) Moorer wrote:
> The cathode follower for the IF output on the R-392 is very poorly
> designed. The waveform is essentially saturated on one side - it is
> quite ugly and has lots of harmonics. This waveform is not used
> internally - it is only for external SSB converters. It does tolerably
> well for that.

I'm glad somebody said something about this - noticed this when putting the signal into my scope, was thinking of external detectors, etc. myself. Thanks.

Date: Sun, 06 Nov 2005 19:16:29 -0500
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: [R-390] R-392 Power Supply

Finally satisfied with my R-392 Power supply. At first used a 28VDC, 4A supply that was handy, but it went into current limit when starting, and got too hot for my taste. I ordered two transformers, an LM317-based regulator kit, an 8Amp bridge rectifier, and heat sinks. Wired a 120 to 25VCT, 8 amp transformer to the 8 amp rectifier and used this to supply the filament current (J103-pin D). It only pulls about 2 amps normally, but pulls 8 amps for about ten seconds as the filaments heat up. Heat-sink the rectifier. A second transformer 120 to 28V at 1.5 amps, supplies the LM317 Regulator kit. this supplies 32-33 VDC to the B+ input (J103-pin A). Added 100pF caps across all rectifier diodes to get rid of a little hash from turn-on spikes. Runs much cooler now. Before, the heat-sinks were setting at about 50C, now the rectifier heat sink is the hottest at 34C, the LM317 heat sink (admittedly large, since that is what I had) sits at 31C. It is disapatting only 2.5 watts peak, and about 2 Watts average. Switching between AC supply and DC Batteries shows no increase in noise. If anyone wants a parts list and schematic, e-mail me.

Date: Thu, 17 Nov 2005 15:00:32 -0800
From: gregory mengell <gregorymengell@comcast.net>
Subject: [R-390] R 392

Fair Radio has just recieved a shipment of R 392 recievers. They will be sold Checked complete with substitute meters for $500.00.

Date: Thu, 05 Jan 2006 20:47:10 -0800
From: "Dan Merz" <mdmerz@verizon.net>
Subject: RE: [R-390] My R-392 Starts Singing

Hazama, as best I remember, my 392 worked right away like yours after I put the power to it. I then checked all the tubes on a tube tester and replaced a few weak ones, as I recall 26A6's. I never had to do anything else to the radio. It's worked ok since, now about 13 years later. I don't use it very often since I obtained a 390a and then a 390. The 390 gets the nod nowadays. When I do turn on the 392, it never disappoints me. The guy that talked me into buying it told me it would go forever with little service because of the low plate voltages, and he advocated about 24 volts. I have read that low voltage is a disadvantage, and is made up for in the design with more tubes in the i.f. lineup and moreover that 26A6's and 26A7 suffer loss of gain, or tend to be unpredictable in gain, compared to tubes with higher plate voltages. It sounds like your radio is doing well for no tube checks yet. I run mine at about 23 volts. I suspect it would

operate better at somewhat higher voltage but I followed the advice of a veteran military collector and built the unregulated supply that he recommended with so much capacitance that I have to bring it up to power gradually to avoid blowing the appropriate line fuse to the power supply. I finally added a delay relay so I didn't forget, or have to use a variac. It has the biggest cap I've ever used in a power supply, 54000 mfd, 30 volts, mostly chosen because it was there at the swapmeet for $1 and it gets the voltage up with the transformer we found. It's mate still is unused in my storage cabinet. I just went down and tried my 392 on 80 meters at 23volts and 26 volts using a variac to see if I could tell a difference... yes, more gain at 26 volts (about 1/8 turn on the rf gain control) but band noise was high enough and I had enough reserve in rf gain setting that it didn't help on the particular station I was listening to. The 390 was on in the background and was much less noisy on the same station. I've got a Lambda LMD24 supply that I found recently and I think it can be tweaked to up to 25 volts which might be a good replacement for my homebuilt supply to get a little more gain, and maybe I should check my tubes again. I think I have afew spares to exchange in the set.
Regards, Dan

Date: Fri, 06 Jan 2006 01:26:41 -0500
From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] My R-392 Starts Singing

IMHO the R-392 is probably one of the most neglected receivers in terms of use and maintenance. This, I offer, is due to the fact that (a) they're small, (b) require a DC supply (c) usually operational on delivery or after a bit of tube replacing, (d) are usually unhacked so don't require un-hacking, (e) have sealed cases so no corrosion, weathering, dust inside, and a couple of reasons I'm probably forgetting. Well, one indication is that many of us have them, but they rarely turn up in threads on this reflector -- almost as if they're a member of the family who should not be discussed in mixed company ;-).

I have several. All work. One day I bothered to do a full -- or mostly full -- alignment on one of them. Quite a difference. Decent performance became very good/excellent performance. So do take the time to go through a full alignment. Chances are, the mechanical alignment is good, but the coils etc could benefit from a touchup. When tuned up with good tubes, performance is very close to an R-390/R-390A. There's something on Josh Rovero's web site about detailed comparisons. One limiting factor is the choice of bandwidths vs. the big ones and the AGC adjustment, but otherwise he found the sensitivity and selectivity to be nearly identical.

As for voltage, nominally these are 28 volts which represents a 24 volt vehicular power source. These normally vary between 24 and 27.6

(27.8?) volts depending on generator/battery/engine RPM's. There are actually two separate pins on the 9 pin connector for filament and B+. The word is that best performance and tube longevity can be obtained by running the filaments at 24 volts and the B+ as high as 32. Of course, that means two separate power supplies, so a happy medium might be the 26 vdc. You could use a beefy 24 volt supply and a lower current bench supply to provide the B+ I guess.

Due to the relative smallness, but sturdyness, R-392's have a tendency to wind up under the bench or in a closet with stuff piled on them, so often have to be dug out before use. The big gray ones can't hide in small spaces that well.

Suggest you check out Josh's R-392 web pages if you haven't found them already at http://www.roveroresearch.com/r392/r392.html

OK, remembered another possible factor. To get audio out of these radios, the easiest and most authentic thing to do is use an LS-166 speaker that already has the UG audio connector, so it's plug 'n play. However, the LS-166 is designed to be concussion-resistent and waterproof. It has inner and outer protective perforated baskets enveloping the speaker cone and the suspension is very stiff. They are, in effect, acoustic suspension enclosures (no ports) but with the opposite of the high compliance driver that hi-fi acoustic suspension speakers typically incorporate. As a result, the sound is fairly crummy. Sound quality can be much better if fed to a normal speaker through a 600-8 ohm transformer. Or, you can tap into the matching transformer inside the LS-166 and run it to another speaker or use an amplified speaker adapted from a computer speaker package right off the 600 ohm output. One of these days I'm going to slightly modify one of my LS-166's -- install a mini phono jack which will cut out the internal speaker when an external one is plugged in. I just need to get a round tuit. Square ones don't seem to work so good.enjoy .. Barry

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Date: Fri, 6 Jan 2006 07:53:01 -0600
From: "Craig Anderson Ext 1365" <Craig.Anderson@saintpaul.edu>
Subject: [R-390] RE: R-392 Tubes

As long as we are on the subject of R-392's, I have two of these little beauties sitting next to my R-390A's. For those of you who have 392's you had better look at the current price and availability of 26C6's. The last JAN NOS 26C6 that I bought was $10. I finally decided to try to solid state the three 26C6's and it was very easy using 2N3819 N-Channel FETs using three Alden tube 7 pin test sockets sold by K5SVC

http://cgi.ebay.com/ALDEN-7-PIN-TEST-

SOCKET_W0QQitemZ5779640770QQcategor
yZ4871QQssPageNameZWDVWQQrdZ1QQcmdZViewItem

It took all of a few minutes to complete the conversion and it is reversible. I just ordered a few more of the Alden sockets to do the other radio. FYI Bill Perry of Wm Perry & Associates still stocks NOS Amphenol 164-4FS 9 pin female power plug for $20. I also see that there are 6 transistorized audio modules for sales on EPay

http://cgi.ebay.com/Transistorized-Audio-Module-for-R-392-R392-URR_W0QQi
temZ6594628548QQcategoryZ588QQssPageNameZWDVWQQrdZ1QQcmd
ZViewItem

I have one installed in one of my radios and it works great after I had to remove a feedback resistor in my audio driver (I think it was an 8.2 Meg) It will squeal unless you do. My radio is a '52 vintage and the newer ones apparently were changed to accommodate the solid-state audio module and had the feedback resistor built into the module. It is a great radio but you definitely need a tube puller. Fortunately one of mine came with the two finger style tube pullers installed in the radio.

Date: Fri, 06 Jan 2006 11:29:56 -0500
From: Mark Huss <mhuss1@bellatlantic.net>
Subject: [R-390] P101 Connector for R-392; [
Re: Amphenol type 164-4FS connectors]

>Yes, we have the connector in stock. $20 plus $4 shipping. Thanks, Tim

Confirmation that R-392 Power Connectors are available. $20 is a good price for these new-old stock. Get them while they last, guys!

Date: Sun, 03 Sep 2006 10:49:33 -0400
From: Carole White-Connor <carolew@bellatlantic.net>
Subject: [R-390] R-392 v. R-390

Isn't theFair Radio price for the R-392s ($550) about what they charged for
R-390As before they ran out of them? How would you folks compare the R-392 to the R-390A or R-390 (non A) in terms of value, performance, reliability and ease of repair? I have an R-392 and an R-390 (non A). In terms of audio, it's no contest. The R-390 wins hands-down. However, in terms of sensitivity and selectivity, they seem awfully close. Both are impressive performers.

Date: Sun, 03 Sep 2006 12:25:11 -0400

From: Barry Hauser <barry@hausernet.com>
Subject: Re: [R-390] R-392 v. R-390

About $550-600 for the last of the R-390A's as I recall. Probably just a coincidence. The increasing price of the R-390A's reflected the amount of work and module-swapping they had to do, as well as refinishing the front panels. As for the R-392's, probably more to do with limited supply as well as some prep./repair.

.....compare the R-392 to the R-390A or R-390 (non A) in.....

Josh Rovero has some web pages on this -- including a direct comparison. When fully tuned up, the the R-392 performs pretty closely on par with the
'390's, within some built-in limitations -- namely just 3 bandwidth settings. I've had several '392's and actually took the time to do a full alignment on one or two of them. Although they seemed to work OK beforehand, what wound up as a touchup alignment made quite a difference. Here's the link to Josh's page
http://www.roveroresearch.com/r392/r392_3.html

.....However, in terms of sensitivity and selectivity.....

What speaker were you using? If you were using an LS-166 with the R-392,
that's probably the main reason. Because they are the correct speaker and
have the U-77 ? plug and are "plug & play", that tends to be the speaker that's used. However, the LS-166 is a voice frequency unit and water/concussion resistant. It is basically an acoustic suspension box, but designed with no regard for the parameters necessary for fidelity. Generally, speakers have to be either ported (i.e. bass reflex, or open back) or sealed to deal with the back wave. Of necessity, the LS-166 is sealed, but the volume of air behind it is too small and acoustic suspension designs call for high compliance cones and spiders (the corrugated thing around the voice coil). The driver in the LS-166 is very stiff and motion is further restricted by additional screens both in front of and behind the cone. (blast & water pressure protection) Some say that the small cylindrical matching transformer also has something to do with it. If you are using an LS-166, try another speaker with a separate 600-8 ohm transformer, or just try running it with the back cover removed. If you don't mind a small modification, you can mount a mini phono plug in the side or back of the LS-166 and wire it so that when an external speaker is plugged in, it disconnects the internal one. If you want to use a set of amplified computer speakers, you can tap off ahead of the transformer (600 ohms) and eliminate that from the chain. You can also pick up one

of those connectors (Fair Radio has cut-offs) and wire up a dedicated computer speaker setup. Barry

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Date: Wed, 27 Dec 2006 13:09:00 -0600
From: "Dave Merrill" <r390a.urr@gmail.com>
Subject: [R-390] U-77/U Connectors Available

John Baronosky of BARANS SURPLUS has a quantity of U-77/U connectors for sale at an attractive price - $1 ea for cutoffs or $2 ea with approx 5 feet of 8-conductor cable attached. Shipping is a flat $5 for whatever will fit in the Priority Mail Flat Rate envelope. The ones he sent me were all made by FRANK and were in good, used condition. The contacts on a few were a little fuzzy but they cleaned up easily. See photo links for typical examples. The yellow band on the cables is marked CX-1070D/U if that matters to anyone. So if your R-392, T-195, PRC-41, PRC-47, RT-66,67,68 etc needs an mating audio connector, here's a good opportunity.

Contact John at BARANOSKYBUNCH@aol.com - DO NOT REPLY TO ME!

http://img74.imageshack.us/img74/1189/u77cutoffpd6.jpg

http://img82.imageshack.us/img82/7072/u77cableii8.jpg

Date: Thu, 28 Jun 2007 20:01:36 -0500
From: Tom Norris <r390a@bellsouth.net>
Subject: [R-390] R392 Tubes Available

Hey you guys out there with R-392's, take a gander at what this fellow has to offer --

http://stores.ebay.com/K5SVC or tube search http://tinyurl.com/2laxbu
The guy has all the tubes for your 392 other than the 26FZ6 front end improvement used in later contracts. I've dealt with the seller in the past and he's always been good.

Date: Tue, 09 Oct 2007 11:34:34 -0400
From: Charles A Taylor <WD4INP@isp.com>
Subject: [R-390] R-392 connectors

Does anyone have a power connector for an R-392?
I have to build a power supply for mine and need the connector
Glad to pay any reasonable price!

Date: Tue, 9 Oct 2007 11:52:56 -0400 (EDT)
From: <wf2u@starband.net>

Subject: Re: [R-390] R-392 connectors

There are 3 (possibly 4)sources for these connectors:

1. Fair Radio
2. William Perry
3. Steve Haney
4. Robert Downs (maybe)

Date: Tue, 8 Apr 2008 22:32:17 -0400
From: "Paul Anderson" <paul@pdq.com>
Subject: [R-390] 26A6 tubes FS

I bought several hundred 26A6 tubes from Tom at piffsniff@aol.com - he says he has around 600 more. His price is "Lots of ten/$20 - 75 or more $1 each plus actual shipping." These are used in the R-392. I only know him as a one time buyer, but I was impressed with him.

Date: Mon, 28 Apr 2008 08:20:42 -0400
From: "Thomas Guest" <Thomas.Guest@TRW.COM>
Subject: [R-390] R-392 Connectors

I just picked up a Western Electric R-392 radio over the weekend. It looks good and seems complete with the exception of the tools. I am hunting the mating connectors for the audio and power. Would anyone have a set for sale??? Or know where to find them? Also are there anything I should look out for (caps, resistors, etc...)? I don't want to damage the receiver by just power it up. I have downloaded the manuals from the net and will start to read up on this unit.

Date: Mon, 28 Apr 2008 07:41:26 -0500
From: wf2u@ws19ops.com
Subject: Re: [R-390] R-392 Connectors

Fair Radio should have them. You can also try William Perry Co., he usually has any military connector you may ever need...

Date: Tue, 29 Apr 2008 07:24:46 -0400
From: "Thomas Guest" <Thomas.Guest@TRW.COM>
Subject: Re: [R-390] R-392 Connectors

Thanks for the info on William Perry. Nice guy and he had the connectors at a fair price. I was shocked when he said that he will ship them and when I get them to send payment if all is OK. You don't hear that method used anymore. If I ever need more connectors he will be my first call I make. Once again thanks for the help. Tom Guest

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Date: Mon, 21 Jul 2008 07:08:10 -0400
From: "Thomas Guest" <Thomas.Guest@TRW.COM>
Subject: [R-390] Need tubes and help on a R-392

I have a R-392 that I picked up a little while ago. After a couple of minor repairs the set works well. I got around to checking the tubes and I have found that some of them are weak. I would like to try swap in some new tubes to see if I can get it to work better. Would anyone have these tubes for sale or know of where to find them?

4-26A6 2-26C6 1-26D6

Also when I got the set working it seems to be off on the frequency display by about 10 kHz. The counter seems correct from fully clockwise to fully counter clockwise. Does this mean the cams in the gear train need to be aligned or is there something else I should be looking into?

Date: Mon, 21 Jul 2008 10:34:37 EDT
From: DJED1@aol.com
Subject: Re: [R-390] Need tubes and help on a R-392

If the set is working pretty well the cams are probably OK (and they affect everything but the frequency readout). Now I'm extrapolating from my R-390A, but the frequency offset is probably caused by a misalignment between the frequency readout and the PTO. The first step is to see if the zero adjust will allow correction of the 10 Kc. On my radio, you set the dial at the correct 100 Kc point, turn in the zero adjust, then turn the dial to zero beat with the calibrator. If that will correct the offset, you're all set. If the zero adjust doesn't have enough range, then you may have to loosen the coupling between the geartrain and the PTO, then manually set the PTO on the correct frequency and retighten the clamps. If the overrun at each end of the dial is about the same, that indicates to me that the PTO is off a bit. Can't help you with details since I haven't worked on a R-392.

Date: Mon, 21 Jul 2008 10:41:03 -0400
From: <jmiller1706@cfl.rr.com>
Subject: Re: [R-390] Need tubes and help on a R-392
Content-Type: text/plain; charset=utf-8

If this is the same PTO as the 390A, there is an endpoint adjustment coil on the front of the PTO to correct the endpoints (a screwdriver adjustment). More than likely the PTO components have drifted with age such that this coil adjustment will not compensate enough. In the 390 archives there should be a procedure for removing and opening the PTO,

then removing a turn off of the endpoint adjustment coil to bring the endpoints back in again.

Date: Mon, 21 Jul 2008 12:50:14 -0400
From: "Thomas Guest" <Thomas.Guest@TRW.COM>
Subject: Re: [R-390] Need tubes and help on a R-392

I would first like to thank everyone who responded with tube location and or correction for my tracking problem. I will order from AES. I almost never remember to check there anymore. I used to buy from them when they sold antique radio part but since they changed hands and the audio is their bag I buy from other suppliers. I will try the fix for the PTO. It sounds like that should correct the issue. Once again thanks a bunch.

>>> "James A. (Andy) Moorer" <jamminpower@earthlink.net> 7/21/2008 11:47 AM >>>
Antique Electric Supply has all these tubes (www.tubesandmore.com)
In the "search" box, type in the tube number with "T-" in front, like "T-26A6" (without the quotes, of course). If you prefer, I have all these I can sell you for $4.00 each (plus maybe $5 for shipping), but I am out of town right now and won't be back until 7/29.I could ship them after that.

James A. (Andy) Moorer
www.jamminpower.com

Date: Mon, 13 Dec 1999 00:59:35 -0600
From: Nolan Lee <nlee@gs.verio.net>
Subject: Re: [R-390] 6AJ5 replacemnt

The 6AJ5 is basically a 6AK5 that works with 28V on the plate rather than normal B+ voltages. Try each of the 6AK5's that you have. I'd almost bet money that several of them them will work just fine in the R392.

Date: Sat, 10 Sep 2011 18:05:29 -0400 (EDT)
From: frankshughes@aim.com
Subject: [R-390] R-392 fun!

I had some fun coming up with all the pieces and parts (some assembly required) to get the "new to me" R-392 working and make SSB easy to tune.

- Found a 28vdc 9-amp LAMBDA switcher (small form factor) on e-swamp
- Skycraft surplus had a ball bearing 24vdc fan
- Sporty's pilot shop had a nice, compact 28-12 DC converter
- Electronic specialty products had the tiny PD-2 SSB adapter operating on 12vdc

- JAMECO electronics had a little 12vdc audio amp
- Mouser had a 47k ohm audio taper pot.

http://i180.photobucket.com/albums/x257/fish1_07/R392_lambda_dc_converter.jpg
http://i180.photobucket.com/albums/x257/fish1_07/collins_R392_ssb_speaker_power2.jpg
http://i180.photobucket.com/albums/x257/fish1_07/R392_amp_speaker_ssb1.jpg

The R-392 did not work when I received it, found V201 (1st RF amplifier) shorted. I did not have any 26FZ6, but a 26A6 was the optional replacement I used to get the R392 going until I could find a 26FZ6. Turned out there is a local source for the 26FZ6, including a very interesting copy of the original 25 Sept 1958 letter starting the development of this unique tube.

http://i180.photobucket.com/albums/x257/fish1_07/26FZ6letter1.jpg
http://i180.photobucket.com/albums/x257/fish1_07/26FZ6letter2.jpg

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Date: Thu, 23 Jan 2014 12:38:19 -0800 (PST)
From: Perry Sandeen <sandeenpa@yahoo.com>
Subject: [R-390] R392 Audio

Perhaps a simpler alternate to Charles tube re-design of the audio output circuit would be to use one the LM series of audio output IC's. They range from 2 to 70 watts or so output and many have been designed for high-end audiophile equipment so they have low THD. Besides needing minimum additional components to use, most are under $10. FFT.

Date: Fri, 24 Jan 2014 06:06:29 -0600
From: Tom Frobase <tfrobase@gmail.com>
Subject: Re: [R-390] R392 Audio

Charles was there not a solid state module developed by the military for the 392? How did it work?

Date: Fri, 24 Jan 2014 12:53:50 +0000 (UTC)
From: bavarianradio@comcast.net
Subject: Re: [R-390] R392 Audio

Sticking solid-state devices in an R-392 completely eliminates the EMP aspects of it's use... (I'd like to experiment with tube mods on my 2 392's)

Date: Fri, 24 Jan 2014 07:25:23 -0600
From: Chris <kc9ieq@yahoo.com>
Subject: Re: [R-390] R392 Audio

While I don't doubt it would be somewhat involved to solid-state the audio output of a R-392; Pray tell what is wrong with the audio quality of say, the old LM386N? They can be run up to 28V, are capable of 4W at under 1% THD, and have a basically flat frequency response to well over 100kHz. THD and bandwidth for this device far surpass specs of *just about* any communications receiver ever manufactured. Not your $10,000 Marantz perhaps, but I really don't think that is the goal here.....

Date: Fri, 24 Jan 2014 07:27:23 -0600
From: Chris <kc9ieq@yahoo.com>
Subject: Re: [R-390] R392 Audio

Typo, meant the LM384N not 386

Date: Fri, 24 Jan 2014 06:44:35 -0800 (PST)
From: wli <wli98122@yahoo.com>
Subject: Re: [R-390] R392 audio

There are many LMxxx and classD amps out there. As Bernie and Perry have noted, these draw little current, and their audio output is phenomenal. Do not believe that powering these devices from a unipolar source is a real problem. Over the years, there have been published many discrete SS audio amp mods published, that run off of the 28VDC filament source. My 02? opinion for what's it worth.....

Date: Fri, 24 Jan 2014 09:57:58 -0500
From: "Meir WF2U" <wf2u@ws19ops.com>
Subject: Re: [R-390] R392 Audio

The original, military contract plug-and-play solid state replacement module for the 26A7GT audio output tube is here:
http://www.roveroresearch.info/home/boatanchor-radios/r392/r-392-technical-d
ata/r-392-hints-tips-and-mods/r-392-official-solid-state-audio-module .

The military depot upgraded R-392's had a modification to accommodate the module: R629, a 8.2 megohm resistor that provides feedback to V606, the first AF amp, is used in receivers that use the original 26A7GT, are removed in receivers with the "official" SS audio module. This feedback is provided inside the solid state audio module. One of my R-392 receivers came with the original plug-in SS module and it works great.

Date: Fri, 24 Jan 2014 12:25:06 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R392 Audio

..... solid state module.. Yes, indeed. It is documented in Figure 20 of the 1961 R392 manual, TM-11-5820-334-35. Meir posted some information about it, including the fact that the external feedback resistor (R629) must be removed when the Solid State Audio Module is installed (because it has too much phase shift to remain stable in a global feedback loop). This means that the preceding audio stages (V606 and V607) are no longer inside a feedback loop. IMO, it is a lot better than the original 26A7 circuit, although it is a bit noisy.

Date: Fri, 24 Jan 2014 13:17:47 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R392 audio

>There are many LMxxx and classD amps out there. As Bernie and Perry >have noted, these draw little current, and their audio output is phenomenal.

As I said previously, the audio quality of such devices is fine for lo-fi applications like communications radios. However, the limitations of integrated construction place significant constraints on their circuitry and operation. They cannot perform in the same league with discrete designs and, as I said previously, for that reason they are not used even in decent mid-fi products. Perfectly adequate (and well-suited) to communications audio and other non-demanding applications. But no better than mediocre by any hi-fi standard, and certainly not "high end" or "phenomenal" in terms of sound quality.

Date: Fri, 24 Jan 2014 11:37:52 -0800 (PST)
From: Johnsay Johnsay <groundwave@yahoo.com>
Subject: [R-390] R-392

The 26A7 has always been the fly in the ointment with the R-392. A 16 watt heat sink that produces a quarter watt of lo-fi audio. The audio quality is at least acceptable with the military headphones and handset.? Pretty bad with a directly driven speaker, impedence matched or not. I'm

otherwise very fond of these radios. Mean and green.... My solution has been to use a set of computer speakers (or alternately a PA-amp) directly connected to the audio. Sounds good but leaves the 26A7 intact. I think the best solution is one that eliminates the 26A7 and bypasses the existing output transformer. I'd be willing to play around with mods though. I have a couple R-392's and a free standing audio module.

Date: Fri, 24 Jan 2014 11:39:19 -0800
From: David Wise <David_Wise@Phoenix.com>
Subject: Re: [R-390] R-392

Letting a tube run at zero bias is just wrong...

Date: Fri, 24 Jan 2014 14:34:11 -0600 (CST)
From: Jim Haynes <jhhaynes@earthlink.net>
Subject: Re: [R-390] R-392

I will point out here that the Sunair DSB-900 quasi-military transceiver uses an automotive-type audio amplifier to drive the little built-in speaker and to me the intelligibility seems excellent.

I should say they misuse it - the original part is rated for a maximum of 26 volts supply voltage and they run it from 28V using four series silicon diode drops, which is hardly enough. That part is no longer available (except from some ebay vendors in England) so when mine blew out I replaced it with a present-day part of the same genre, but one with different pin connections and a maximum voltage of 18 or so. So I used a Zener diode to get a propert voltage drop from the 28V supply. And because the pin connections are all different it is quite ugly, but at least it is out of sight. The original part was a UA783. The replacement I used is a TDA2003.

Date: Fri, 24 Jan 2014 15:34:49 -0500
From: "Meir WF2U" <wf2u@ws19ops.com>
Subject: Re: [R-390] R392 Audio

For those who can't get the official issue SS module schematic via the link in my previous message, here is the same link, shortened by TinyURL: http://tinyurl.com/pmzzbgu . Long URL's sometimes don't go through some email clients, but even then it can be just copied and pasted into the browser. TinyURL saves you that operation and links directly.

Date: Fri, 24 Jan 2014 17:51:58 -0500
From: Roy Morgan <k1lky68@gmail.com>
Subject: Re: [R-390] R392 Audio

Thanks much. Also, you can enclose long URL?s in brackets. Many, perhaps not all, email programs will pass a line-wrapped URL properly to the browser. Like this:

<http://www.roveroresearch.info/home/boatanchor-radios/r392/r-392-technical-data/r-392-hints-tips-and-mods/r-392-official-solid-state-audio-module>

Date: Fri, 24 Jan 2014 20:39:55 -0600 (CST)
From: Jim Haynes <jhhaynes@earthlink.net>
Subject: [R-390] R-392 audio

I have this schematic, don't know where I got it, and it has the name of S. Johnson and the date 6/6/91 showing the use of two IRF511 FETs in a plug-in replacement for the 26A7. I don't know if the attached schematic will make it through the mail system, so you can ask me for copies individually if necessary. And if anyone knows the source of this item please speak up.

Date: Fri, 24 Jan 2014 23:40:40 -0800 (PST)
From: "Drew P." <drewrailleur807@yahoo.com>
Subject: Re: [R-390] R392 Audio

Simpler yet would be to bring out the audio at low level, before the R-392 output stage, and feed it to an amplified computer speaker. Some of these sound pretty decent, at least as compared to typical communications receiver audio, and many of them use the LM series of audio output IC's.

Date: Sat, 25 Jan 2014 09:10:39 -0500
From: Bob Camp <ham@kb8tq.com>
Subject: Re: [R-390] R392 Audio

This is a slippery slope. Once you start going solid state on the 392, where do you stop?

The whole audio section of the radio could be converted without a lot of crazy work. That drops three tubes. Then there?s the detector and noise limiter. Then the squelch stuff and squelch diode. Except for some diodes, it?s all audio. Solid state audio of this nature is pretty simple.

That’s a lot of heat out of the radio. I’d also bet it could be done in a way that would make the radio work better. The radio is sort of a bit of this and a bit of that once you are done. Not really an R392 any more.

Date: Sat, 25 Jan 2014 20:03:32 -0800 (PST)
From: Perry Sandeen <sandeenpa@yahoo.com>

Subject: [R-390] R-392 SS Audio Mod

All, I've digitized the simple, but highly effective, R-392 FET output circuit by S. Johnson in 1991 and sent to me by Jim Haynes. I first converted it into a BIT image and then to a MS word document and then to PDF file so all could see it regardless of your computers operating system. Contact me off list you want a copy.

Date: Sun, 26 Jan 2014 09:57:45 -0800 (PST)
From: "Drew P." <drewrailleur807@yahoo.com>
Subject: Re: [R-390] R-392 Audio

There must be an error in the schematic for the "official" R-392 solid state audio replacement module posted on Rovero's website (not the MOSFET version Perry is offering).

As shown, the posted version would have excessive crossover distortion because there is no forward bias on Q603 and Q604, the output transistors. Sure enough, R647 & R648 appear to supply such bias to the output transistors' bases, but the bias would be shorted to ground via driver transformer T604's grounded center tap on the secondary winding.

In many circuits of this type, the driver transformer would have a voltage divider supplying the center tap of the driver transformer secondary, through which forward bias would then be supplied to the output transistors. Frequently the voltage divider would incorporate a temperature sensitive element (diode or thermistor) which would be thermally coupled to the output transistors to avoid thermal runaway.

Date: Sun, 09 Feb 2014 15:43:35 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: [R-390] Super simple R392 audio mod

As discussed previously, the R392 runs its 26A7 output amplifier tube (V608A/B) with only about -0.25v of contact bias developed across the 470k grid resistors and drives the 26A7 grids through coupling capacitors from split-load phase inverter V607. Thus, when there is audio the 26A7 grid current charges the coupling capacitors on positive signal peaks, thereby rectifying the audio signal and causing massive distortion.

I proposed a super simple mod to correct this gross distortion; however, since I do not own an R392, I needed volunteers to test it and verify that it works. The preliminary results are in, and it does indeed work. I'm still waiting for detailed reports from some of the beta testers, and will publish a fully documented modification after those reports are in. However, we appear to know enough to let everyone in on the fun.

Parts required: One 3.9v, 500mW Zener diode (1N5228B, 1N748A, BZX55C3V9, etc.)

Procedure: V608 Pin 2 (the dual cathode of the 26A7) is grounded by a wire that runs across the tube socket to Pin 7 (grounded end of the heater), which is connected to a ground lug on the tube base. Remove the wire between Pin 2 and Pin 7 (leave Pin 7 connected to the ground lug), and replace it with the 3.9v Zener diode. The cathode (banded end) of the Zener should go to Pin 2, and the anode to Pin 7.

Test: Turn the radio on, and check that Pin 2 measures ~ +3.9v DC with respect to ground (the exact voltage will depend on the tolerance of the particular Zener diode you use). If this checks out, you are done. [If you measure ~ +0.5v to 1v, you probably got the diode in backwards. Be aware that every now and then, manufacturers mark the wrong end of a diode.]

Possible issues: I do not know if all R392s are built exactly alike. It is possible (but I think unlikely) that some R392s use Pin 2 as a ground tie point for other circuitry. If V608 Pin 2 on your R392 has anything connected to it besides the wire to Pin 7, the other wire(s) or component(s) will need to be detached from Pin 2 and connected to ground independently (that is, they should NOT be connected to the Zener diode -- only Pin 2 should be connected to the diode).

R629: Some R392s were built without R629, or have had R629 removed, for operation with the official solid state output module. This 8.2M resistor provides overall NFB around the audio amp (V606/607/608). If your R392 does not have R629, you should install it for use with a 26A7 at V608A/B.

NOTE: This mod is intended to solve the problem of horribly distorted audio in the R392. It does NOT extend the capabilities of the R392 audio stage in any other way -- it still puts out only a couple of hundred milliwatts into a 600 ohm load. Like the original, it will not drive a low-impedance speaker or phones directly (anything less than ~300 ohms). Note also that V607 produces some nonlinearity before V608 clips, due to the very low B+ (28v). The super simple mod described above fixes the horrible distortion produced in the power output stage of the stock radio, but does not address the much lower distortion generated by V607.

In short, the mod makes the R392 work like it should have worked from the factory, given the parts that were used. As a side benefit, it reduces the plate dissipation of the 26A7 by about 70%, so 26A7s will last much, much longer than they do in a stock R392.

My thanks to the beta testers for all of their help!

Date: Sun, 31 Aug 2014 11:51:07 -0400 (EDT)
From: Roger Ruszkowski <flowertime01@wmconnect.com>
Subject: Re: [R-390] R-392 market prices and availability?

Sign up on the Boat Anchor reflector and ask this question. One of the Fellows had a pair for 100 each at the Shelby swap meet Saturday and did not sell them. There was a third one I also saw at the meet. They can be had. They were mostly vehicle mounted and run off the 24 volt system. So you have to put up your own power supply. But this makes them inexpensive.

Date: Sun, 31 Aug 2014 12:11:59 -0500
From: "Bill Hawkins" <bill@iaxs.net>
Subject: Re: [R-390] R-392 market prices and availability?

The R-392 has a waterproof case. When you open it, there is a refreshing smell from when it was built. FWIW, I bought a 392 from a guy in Iowa with a power supply that he claimed came from the Collins lab. It has a non-standard transformer that could have been hand-made. Rectifier has big selenium disks. Sold the 392 in a package of back-breakers. Still have the supply.
Picture on request. Make offer if interested.

Date: Sun, 31 Aug 2014 13:23:26 -0400
From: Al Parker <anchor@ec.rr.com>
Subject: Re: [R-390] R-392 market prices and availability?

I know the fellow who had the 2 R-392's, I thought they were gone when I left at 1PM Sat., but maybe not. I'd looked at them, neither was all there, but one good one might have been made from the pair. I think one in good wkg condx usually goes for $300 +- whatever, particularly if it has a useable pwr supply of some sort.

Date: Sun, 31 Aug 2014 13:57:29 -0400
From: Bob Camp <kb8tq@n1k.org>
Subject: Re: [R-390] R-392 market prices and availability?

Before heading down the 392 route (been there done that) consider a couple of things:

1) You will need to dig up a supply of 28V filament tubes. They are not impossible to find, but you probably do not already have them.
2) The audio and power connectors are military items and often is hacked in the process of bring in +24 to the radio or audio out. If you want to

assemble the full RX+TX package this can be an issue.
3) Audio output is at best anemic. Yes there are ways to get around this. Often radios are hacked to do so. It?s certainly something to ask about on any radio you buy.
4) Good, well regulated, 28 V power is not as hard to come by today as it once was. Check the price of supplies before you pay extra for a radio with a marginal supply.
5) The radio was designed to “fit in this space”. At least to me, the controls are not quite as accessible as those on some other radios. They are a bit cramped.
6) Some radios got fully solid stated way back a long time ago. I would avoid those radios, the MOSFETS used are pretty much all gone. The chopping and splicing to get it done often made reversing the process difficult. I never saw a solid state version that worked as well as the tube version of the same radio.
7) The 392 is a ?no filter? radio. In other words the selectivity comes from a bunch of tuned IF stages rather than a packaged mechanical / ceramic / crystal filter. That gives it a bit different sound than a lot of more modern gear. It also does not provide quite the razor sharp narrowband selectivity that some other radios do.

None of that is to say don’t get one. They are a fun radio. I’ve owned several over the years. Just be aware of what you are getting and shop accordingly.

Date: Sun, 31 Aug 2014 15:44:33 -0400
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R-392 market prices and availability?

There was a military SS replacement module that (IMO) stinks. Maybe not as bad as the tube audio, but still horrible, IMO (though there are some who like them). Requires a small modification to the radio to add this module.

There are also at least two decent mods for the audio: There is a MOSFET replacement circuit floating around, attributed to "S. Johnson," that looks as if it would be a very good solution. And there is a super simple mod I developed to make the existing 26A7 output stage sound much better and preserve the life of the 26A7, which I described in a list message on 2/9/14 (this mod does not
extend the capabilities of the anemic audio stage, which puts out less than 1/4 watt into 600 ohms -- it simply makes it sound much better). I can send you schematics of these if you get a 392 and would like them. If you do the super simple mod and then use the output to drive an external amplifier (push-pull 6V6s would be superb), the audio should be quite good.

I'd look for an unmolested original radio and then make whatever changes you decide are best.

>6) Some radios got fully solid stated.....

I concur regarding SS conversions you may find in the wild. In principle, however, it should be possible to do a SS conversion that improves performance all around, while getting rid of the current draw and power dissipation of the tube filaments. I've never had a 392 of my own, so I've never tried it, but it would be a very interesting project.

>7) The 392 is a "no filter" radio.....

It's not correct to say the 390 is a "no filter" radio -- it has 5 big LC IF filter cans nearly identical to those in the famed R390. Actually, this is an advantage compared to a 390A for almost all listening, IMO. The 390A uses mechanical filters with pronounced group delay and ringing at the passband edges, which is unpleasant and fatiguing to listen to. Consequently, once the audio-section
problems are fixed, a 392 sounds much better than a 390A (when both are used at a power level supported by the 392, or with an external amplifier). It sounds much like a 390, in fact (no surprise). Some of us have installed R390 IF strips into our R390As for just this improvement. See Tom Marcotte's outstanding 5/18/11 post on this list detailing the procedure.

Date: Sun, 31 Aug 2014 18:33:26 -0400
From: Bob Camp <kb8tq@n1k.org>
Subject: Re: [R-390] R-392 market prices and availability?

> I'd look for an unmolested original radio.....

or just get an amplified speaker.

>> 6) Some radios got fully solid-stated.....

The output impedance of the tubes is the issue. It?s actually quite hard to find devices that will drive the tank coils in the radio without loading them down. Been down that road.

> It's not correct to say the 390 is a "no filter" radio,,,,,,,

I guess we do not agree on the meaning of quotes around a term to indicate a non-standard usage.

Date: Sun, 31 Aug 2014 19:17:04 -0400
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R-392 market prices and availability?

An amplified speaker is a good way to go, as is an external amplifier with a separate speaker. But you still have to feed the amplifier something, and the existing audio output from a 26A7 running steaming hot with no bias is not a very good source. So it's either fix the 26A7 stage, or tap audio off another point in the radio (and you'll find that there isn't really any good place). Even if you did tap the audio from somewhere else, it's still a good idea to fix the 26A7 bias so it's not wasting power and killing itself. At which point, why mess with tapping the audio someplace else? Just use the newly-fixed 600 ohm AF output.

Date: Mon, 1 Sep 2014 18:10:31 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: Re: [R-390] R-392 market prices and availability?

I have owned two of these. The first one was from FRS and it was complete and original. A good friend built a heavy duty PS for it with regulated 28vdc. My second unit was about $300 with a good PS, cables and speaker. It has a solid state module for the audio section that sounds great. I thought about retrofitting it with the original 26A7 tube etc but it sounds so nice and with such a powerful audio that I' ll leave well enough alone. This solid state module seems to have been used a lot. So, a good unit with PS should be an average of $300. Your mileage will vary.

Date: Tue, 2 Sep 2014 06:01:06 -0700
From: Johnsay Johnsay via R-390 <r-390@mailman.qth.net>
Subject: Re: [R-390] R-392 market prices and availability

The EBay price for these receivers is typically $400-600. A good deal would something in the $200-400 range for a complete, working radio. These are great radios! Information on them is readily available online. Some of the tubes are not common types but for now seem readily available. Like most demiled equipment the examples that showed up later had the the meters and knobs removed and some were sold with replacement meters. I prefer the ones with the original meters and 1960 era contract dates. I would like to talk to folks who are currently working with the companion T-195 transmitter.

Date: Wed, 3 Sep 2014 09:06:06 -0400
From: Thomas Chirhart <k4ncgva@gmail.com>
Subject: Re: [R-390] R-392 market prices and availability

I bought a Collins R-392 with T-195B with mounting tray several years

ago at a local hamfest for $300. They were rebuilds from Tobyhanna that were never put back in service. I haven't had a chance to play grunt radio op yet. Need to take up weightlifting before I put them on the bench! It takes an Army

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Date: Wed, 3 Sep 2014 10:19:06 -0700
From: "Craig Heaton" <hamfish@efn.org>
Subject: [R-390] R-390A Alignment

Another item to consider is the trimmer cap or caps. Thru the years some metal will have smeared from the metallic section to the ceramic surface. Remove the offending RF can. The cover has two tabs which can be depressed
in order to remove the cover. The bottom shaft of the trimmer is held in place with a keeper. Use a small screw driver to push the keeper off of the shaft. I've used a cotton swab with a few drops of Deoxit to remove the metal deposits.

Date: Sat, 12 Dec 2015 17:22:16 -0500
From: Glenn Scott <wa4aos@aol.com>
Subject: [R-390] Collins ARR-41/R-648 HELP????

I have followed this list for a number of years and have heard little mention of the R-648 receiver. There is a R-648 list but I hear almost no discussion there either. Not sure how many 648's were built but I own one and have repaired several others for clients. It's actually a pretty decent receiver also built by Collins as an COLLINS ARR-41/R-648 RECEIVER. I see them on epay from time to time and they generally sell for somewhere between $350 for fair examples, operation UNKNOWN to well over $900 for good examples promised to WORK!

It covers 190 - 550 Kc and 2 - 25 Mc skipping the AM broadcast band and was designed for aircraft utility with an aluminum frame to reduce weight. It uses a similar counter display used on the 390, 390A's Veeder counter, and others but a little different. Scroll down this page for a pic.
http://www.mrca.ar88.net/photo_gallery/2002_meet_pix/meet_pix.html

I believe all of these were built with dynamotor supplies but many were converted to DC operation once Hams started to get them from the surplus market. My understanding is the R648 was to replace the aging BC 348's but still being a tube unit when Solid State receivers were becoming more readily available. the R648 was a day late and probably MANY dollars short. I am sure this is a NON-OFF TOPIC receiver question/discussion but was wondering if there are others who also use this receiver? As the TV commercial from the 80's, I think, said, "TRY IT YOU MIGHT LIKE IT."

Anyone have an idea on how many were built? Any additional historical info will be GREATLY appreciated. I had asked the group about 2 years ago if there was interest in manuals since I have an EXCELLENT copy with legible schematics and supplemental notes but only heard back form 4 or 5 people; not enough to justify the cost of having a batch printed. Again, any HISTORICAL info will be GREATLY appreciated.

Date: Sat, 12 Dec 2015 20:16:18 -0500
From: Meir WF2U <wf2u@ws19ops.com>
Subject: Re: [R-390] Collins ARR-41/R-648 HELP????

The ARR-41/R-648 was NOT the replacement for the BC-348. It was contracted and purposed as the auxiliary tuneable receiver to accompany the digitally step tuned transceivers which replaced the AN/ARC-8 systems (ART-13 transmitter - BC-348 receiver), such as the ARC-65 and ARC-94 on military aircraft.

Date: Sat, 12 Dec 2015 21:32:56 -0500
From: Roy Morgan <k1lky68@gmail.com>
Subject: Re: [R-390] R392

Actually, David is being kind. That radio is pretty useless, and the tubes it uses are hard to find. The thing will drive you nuts trying to fix it. You don't want to be driven nuts, do you. No, you don't. So just ship it to me and I'll save you from the pain and stigma of being nuts. I'll pay shipping.

HAH!

No, I don?t have an R-392. I think that somewhere I have a partially disassembled module from one, but I never had a whole radio. Here are a couple of notes about it:

- The filaments will run ok on 24 volts, but if you separate the ?plate supply? connection and make sure it gets 28 volts or so, the thing will run better. Apparently the improvement in performance is quite noticeable with full plate supply.

- If the outside is cruddy, just wash it. It?s pretty waterproof. The INSIDE may look pristine, since it was made to be quite well sealed up. Imagine life in the back of a jeep during monsoon season.

Date: Sat, 12 Dec 2015 21:14:37 -0600
From: wes Bolin <k5apl41@gmail.com>
Subject: Re: [R-390] R392

Thanks for the offer to get rid of it Roy, but I'll hold on to this one. I have

owned a couple in the past many years, but this one is a keeper. The power supply will be no problem,cause I bought some Rad Shack transformers when they were shutting down stores in Texarkana. The 392 has been sitting for somewhere around 30 years, the case is really good cosmetically, and the front panel has many layers of dust. Will be a few weeks before I can get it operational, but should be fun. I'll keep in touch.

Date: Sat, 12 Dec 2015 22:47:46 -0500
From: Glenn Scott <wa4aos@aol.com>
Subject: [R-390] Collins ARR-41/R-648 HELP????

Thanks for the update..Do you have any reference material to support your assertion that the R648 was not, in part, designed as a replacement for the BC 348? Honestly, I don't know and the my reason for the post. I have found 2 sites that state/suggest the R648 was infact a replacement for the BC348 including the bottom of the page for this link BELOW.
http://www.mrca.ar88.net/photo_gallery/2002_meet_pix/meet_pix.html

Another link with tech info but no historical info on the R648
http://staff.salisbury.edu/~rafantini/ARR41modifications.htm

There seems to be a lot of info on the R389, 390, 390A, 391 and 392 but very little on the R648. I am willing to pay for copies of any historical info that you may have. Do you have any idea how many R648's were built? I watch epay for this and other receivers bit have only seen 5 or 6 listings over the last 15 years.
Given the general performance of the R648, I am very surprised there is not more info posted on the web. I know you have a lot of Military communications related knowledge as well as equipment and documentation. I have a very nice tech manual on the R648 but it has no historical content. Any info you can provide will be GREATLY appreciated. I hope some of the readers of this list have some specific info regarding the R648.

Date: Sun, 13 Dec 2015 05:22:20 +0000 (UTC)
From: wli <wli98122@yahoo.com>
Subject: Re: [R-390] R-392

Well, the R392 is really a masterpiece of construction: compact, hardened, sealed, and robust. I love mine. It has the best of the 390 and 390A built in, in my opinion. The tubes are not all that hard to find... you have to be cunning and persistent. The one tricky bit is the huge front connector, that Fair Radio still has. Mine happens to be powered with a PowerDesign 3650-S which puts out 0-35VDC at 0-5A that's metered nicely. Don't turn it down should one come up!

** 2013 ebay description copy

US Navy Collins ARR-41 R-648 Military Aircraft HF Receiver with AC Power
Supply and Speaker. This radio was called the flying R-390 and if you?re here looking at this you already know what it is. I flew with these on the P-3B Orion on many deployments during my US Navy career in the early 70?s.
That is why I have this one but it is time to pass on all the stuff I have collected to a new home. We used these at the time to tune in news and music from home as they were not used for more than that back then. The Navy was phasing them out as the ARC-94 HF Receiver on the aircraft at the
time was used for any real communications work. I think the Navy and Lockheed just had so many of these left over from the EC-121 Constellation
and the P2V Neptune programs that they put them in the P-3A and B to use
them up. There was no other real use for the radio as the TT-264 Teletype was tied into the ARC-94 and not the ARR-41. This one has a Military AIMD supplied AC power supply mounted in a nice Hallicrafters Speaker cabinet. The supply gives the radio all the needed voltages and has an audio section (impedance and output transformer) to supply the 8 ohm speaker from the line level as was used to supply the ICS system in the aircraft. I had the cabinets over spayed with Collins St. James Gray and used a nice undercoat of Truck Bed Coating to give it a very tough textured finish. It looks perfect. The front of the Speaker Grill is painted Collins S-Line speaker grill grey. The high low filter switch on the speaker works well. This is an earlier version of the ARR-41 as it has the chrome metal handles. Later versions had the handles pained black and were offset. This radio plays as well as it looks. This is the 3rd one I
have owned and the last. Some of these were just plain deaf and no matter what you did with them they never got much better. This one is hot and the
reason I kept it. I have not spec?d it out and if you think you?re going to be getting R-390 performance from this radio think again. With everything
there is a compromise and this is not an R-390 or R-390A. But these did the
job for Uncle Sam at the time and are light weight and easy to move about. It has been a pleasure using it and remembering the times I would tune in the BBC, VOA or AFRN and feed it through the ICS for everyone to listen to on those long flights. As of right now it needs a mechanical fix. The Veeder Root counter is off by 10mhz. The manual will take you through the calibration procedure. It is well written and easy to follow. I?m just

tired of fixing things and so I'm leaving that up to you. I also have a couple of hand wired in replacement
bulbs (not soldered) but you can get the peanut bulbs on eBay here and put in the correct ones. All the functions of the radio work well. The audio gain pot is scratchy though and no matter how much deoxit 5 I put in there
it is permanent. I would recommend replacing if it bothers you. I even think I have an exact replacement pot for it someplace and if I find it, it will be included with the sale. The front panel has some blotchy spots to the upper right of the counter and below it where AIMD stickers and placards once were. The Navy used a glue that would hold an elephant to the
bomb racks and so the residue stuck. It only shows in certain light. I dabbed some St. James Grey over the spots so it is the correct color and does not detract from the look of the panel. The rest of the panel and the lettering are in excellent shape for the use these got. [shipping details deleted]

On Mar-13-13 at 13:37:15 PDT, seller added the following information:

To answer a few more questions: The ARC-94 HF Radio set consisted of 2 control panels, 2 Collins 618T Transceivers and an antenna coupler with a
tandem dipole/long wire antenna from the tail of the aircraft to the center of the fuselage. The ARR-41/R-648 could be tied to the Teletype through the
HF1 ICS Monitor Selection Switch but during the early 70? we did not use it that way. WWV @ 5, 10 or 15 MHz was the first thing we set the ARR-41 on
during preflight and that was all the tactical use it got. This one does not have a dynamotor. It is plug_and_play with the AC supply. This one works on all bands and all modes. It covers from 190-550 kHz, 2.0-25 MHz

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Date: Sun, 13 Dec 2015 07:00:34 -0500
From: jbrannig <jbrannig@verizon.net>
Subject: Re: [R-390] REF....age and stuff

From my readings, none of the WWII books discuss communication issues from a technical perspective. The complete failure of communications during Market-Garden rates barely a paragraph.

Date: Sun, 13 Dec 2015 14:53:01 +0100
From: Clemens Ostergaard <clemenso@gmail.com>
Subject: [R-390] R-648 and roll call

As long as we are standing up and being counted, I might as well chime in. Still here, but down to two R-390A's now, a mid-town apartment not being as
permissive an environment as I used to have. So instead of 65 boat anchors,
I have 6,5 now. Decimated it is. But they are gone to good homes all over Europe.

Yet I have always looked for an R-648 (and still am) Not many around in Europe. It is certainly not off-topic, building so much on the bigger box beloved by us all. In the wonderful new 800-page (4th) edition of "Shortwave Receivers Past & Present. Communications Receivers 1942-2013", that Fred Osterman sent out last year, he comments that it was to replace the BC-348, and points to the review in Electric Radio Feb 2000. Have we heard from Roger (Ruszkowsky) in this round? So much to learn from
him, and such a great way he has to share his knowledge.

Date: Sun, 13 Dec 2015 11:51:01 -0500
From: Meir WF2U <wf2u@ws19ops.com>
Subject: Re: [R-390] R-648 and roll call

Check out the previous messages about the R-648. Fred Osterman has a number of inaccuracies in several receivers in the book. He is incorrect regarding the R-648 original purpose. As shown in the original documentation, the purpose was to provide an auxiliary tunable receiver with digital frequency display (albeit mechanical) with accuracy and stability close to those of the main HF radio, which was a digitally step tuned transceiver. The R-648 was simply a different, modern, (then) state of the art approach to an airborne HF receiver, while preserving the manual tunability.

Date: Sun, 13 Dec 2015 09:39:09 -0800
From: Pete Lancashire <pete@petelancashire.com>
Subject: Re: [R-390] R-648 and roll call

I have one from of all places a garage sale a good 5 years ago, it is complete but some (fill in your favorite cuss-word) drilled holds in the front for something he never completed. Someday I'll move it up to the top of the pile

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Date: Sun, 13 Dec 2015 18:53:41 +0100
From: Clemens Ostergaard <clemenso@gmail.com>
Subject: Re: [R-390] R-648 and roll call

Thank you, Meir, I always read all messages. It seems to be a question of

wording: the continuously tunable BC-348 was replaced by the continuously
tunable R-648, in order to have such a receiver as an auxiliary in the now digitally step-tuned transceiver set-up of ARC-65 or ARC-94. (In the case of the Fairchild C-119 Flying Boxcar it may have directly replaced the BC-348, presumably with an ART-13.) But of course it would be wrong to say that *all* BC-348 were replaced by R-648, the numbers alone make it impossible.

Date: Sun, 13 Dec 2015 14:32:34 -0500
From: Glenn Scott <wa4aos@aol.com>
Subject: Re: [R-390] Collins ARR-41/R-648 HELP????

I appreciate the info you sent Don and the feedback from Meir. If only 2207, R648's were built, they must be among the rarest of reasonably high performance, at the time, receivers.
<<<NOTE TO GROUP>>>
Don is looking for a set of handles for an R648 if anyone has a set from another device they can spare, Don's R648 will be complete.. Afterall, parting out am R648 is probably punishable by a quick walk on a short plank over waters GREATLY infested with ravenous and irritable sharks. Just saying!!

I can't imagine it would be too difficult to have a correct set of handles fabricated by someone on this list who has access to a machine brake or pipe bender and a steady drill press. I will be happy to provide accurate measurements of one of the handles from my R648. I will also look through my boxes of miscellaneous parts and pieces to see if I happen to have something close or better. It is now also apparent why there is so little chatter on this list regarding this excellent receiver close cousin of the Collins R390 series receivers. If only 2207 were built, I suspect, probably, less than half still remain making them about as rare as the proverbial HENs TEETH...

Date: Sun, 13 Dec 2015 20:18:51 +0000 (UTC)
From: John Saxon <johnbsaxon@yahoo.com>
Subject: Re: [R-390] Collins ARR-41/R-648 HELP????

I am very blessed...I have a 67 EAC 390A, R-392 and an R-648...all working! They are all a lot of fun. There is a 648 yahoo group, but not much happens there. ?Maybe we ought to have this conversation again there ?:-) I also am missing one of the handles on the 648. I am thinking of an experiment. I recently got a 3D printer, still learning how to use it. If it is possible, it would be interesting to print another handle, paint it appropriately and see how it looks.

Thanks to everyone for all the good info on this thread. I was not aware that only 2207 648s were built.

Date: Sun, 13 Dec 2015 16:58:37 -0500
From: Roy Morgan <k1lky68@gmail.com>
Subject: Re: [R-390] Collins ARR-41/R-648 HELP????

I foresee a disaster.

You 3-D print such a handle, smooth it nicely and paint it to look original.
It looks just like the other one.
You forget that it's plastic.
Then some time in the distant future, you need to move the radio.
You drag it off the edge of the table, and the handle breaks.
The radio plummets toward the floor and lands on your foot, breaking many of the small bones in there.
You go to the emergency room and get a cast put on your foot.
The orthopedic doctor has seen it all but is astounded at your story.
You heal enough in 6 weeks to get the cast off but you still limp. Badly.
The radio is still on the floor where you left it.

You don't want this to happen.
Don't make a plastic handle for your radio.

Date: Sun, 13 Dec 2015 16:54:14 -0600
From: Gary Pewitt <garypewitt@centurytel.net>
Subject: Re: [R-390] R392

A suggestion to make your R-392 more sensitive. In the power connector the B+ and heater wires are joined. If you separate them and put about 32 volts on the B+ while leaving 24 volts on the heaters you will improve the reception quite a bit. I've done it and it really does work well. 73
Gary N9ZSV

Date: Sun, 13 Dec 2015 16:56:35 -0600
From: Gary Pewitt <garypewitt@centurytel.net>
Subject: Re: [R-390] R392

Although the outside may be quite dirty the inside will probably be pristine. The unit is hermetically sealed, completely waterproof, will float, and stays very clean inside.

Date: Mon, 14 Dec 2015 12:58:00 -0600
From: wes Bolin <k5apl41@gmail.com>
Subject: [R-390] R392 Problem

I told myself that it would be a couple of weeks before I could work with my 'new' R392. Well I turned all the knobs, and the Bandwidth knob turns freely from one end stop to the the other (180 degrees). So I popped the case and it looks like the coupling of the shafts visible from the bottom is tight. Any ideas on how to proceed? I would think the Bandwidth switch
would have detents. Looks like I have to pull other modules to get to the IF module. Any help appreciated.

I was surprised to see a perforated cover in place of the audio output tube. But its 'spoon' was still working by holding down the audio module. Also have a Dubrow PTO to go with my Dubrow manufactured set, s/n 344.
And, I've had some great inputs about separating filament and "HV" and that's the way I will go.

Date: Mon, 14 Dec 2015 21:49:14 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: Re: [R-390] R392 Problem

Check the couplings carefully. They may look tight but are broken. mine had
the same problem. It was a broken coupling that took sometime to replace. Luckily I had one in my junk box.

Date: Tue, 15 Dec 2015 07:21:35 +0000 (UTC)
From: Norman Ryan <nnryann@yahoo.com>
Subject: Re: [R-390] R392 Problem

A real kerchunker indeed -- the R-1051 detents are a knucklebuster!? Some years ago, I tried lessening the tension on one and learned the hard way that the detent springs are brittle and will snap in two.? Someone on the list (I think it was Roy Acuff) came to the rescue with a replacement, a kind gesture I appreciate to this day.

73Norman From: Don Reaves <donreaves@gmail.com>
Date: Tue, 15 Dec 2015 15:24:37 +0000 (UTC)
From: Richard Green <k7yoo@yahoo.com>
Subject: [R-390] More R648

Another R648 s/n 926 here at the K7YOO qth. It joins the 390A, 1247, and 391 in the pile.If there is a good source for a decent Tech Manual for the R648 ?I would be interested.Technically the R648 has several "features" that are somewhat annoying: filter selection tied to the mode, and no convenient separation of the AF and RF gain control. It would be interesting to hear the rationale behind these "features".?Skip

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Date: Tue, 15 Dec 2015 11:17:44 -0500
From: Roy Morgan <k1lky68@gmail.com>
Subject: Re: [R-390] More R648

I have no special knowledge about the design process, and can only guess as to why those “features” were included:

Imagine being at 20,000 feet in a P-3 aircraft, with winter flight suit and gloves on, in the middle of the night somewhere over the mid-atlantic, and you have to get the radio onto some frequency for a new comm link. You really don’t want extra knobs to twiddle to get the job done. And the signal you are hunting comes from a communication station Stateside that is running plenty of power into big antennas, so digging a signal out of the noise is not needed.

By the way, the later 51S-1 is set up similarly. Filters are selected by the mode switch, but it does have separate RF and AF gain controls and a rejection notch. Otherwise, the thing is disappointingly simple to run, especially compared to the R-390 radios.

Date: Tue, 15 Dec 2015 16:31:56 -0500
From: Rodger Adams <rodger_adams@yahoo.com>
Subject: Re: [R-390] Roll Call (Rodger)

Glad to see there?s some activity here. I?ve been reading the list for a while. I?m 55, and got my Collins R-390 (non-A) about 32 years ago for $200. It was working at the time but has been in my attic for the last 20 years. Finally had some room to bring it into the house so fired it up a few months ago. It was mostly working but did need some TLC. I replaced all 8 47 ohm cathode resistors in the rectifier and regulator circuits. Also replaced most of the RF and IF tubes and the 6BH6 amp tube in the regulator circuit. One of the biggest problems was with the diode load jumper on the back panel. It was a couple of lugs crimped onto a solid copper wire. The crimps had gotten corroded over the years so replacing the jumper with a soldered one made major improvements. Also had a loose/dirty BNC between the RF and IF decks. I still think the band switch probably needs some cleaning but not sure I want to remove the RF deck at this point to get to it.

I have 3 RF deck transformers with stuck trimmers. Does anyone have any thoughts on how to unstick them? I certainly don?t want to risk breaking them. I?ve collected a few spare parts and subassemblies but would love to pick up an RF deck and IF deck.

Anyway, just saying hello and introducing myself to the list. I?m not an

expert by any means, but glad to help out others in any way I can.

Date: Tue, 15 Dec 2015 15:58:02 -0600
From: Cecil Acuff <chacuff@cableone.net>
Subject: Re: [R-390] R392 Problem

Yeah the 1051 was no fun to tune. Three of the tuning knobs were tied to several modules through a system of gears and chains. A beast to work on in several ways...

One of the tuning knobs was right above one of the screws that hold the radio in its cabinet and it usually had a burr on it and would catch your finger while tuning. I left skin on many of those. Later radios had little nylon cups over the screws to protect your fingers while tuning...must have been a complaint of many operators during its military service.

Date: Sun, 31 Jul 2016 19:14:36 -0500
From: wes Bolin <k5apl41@gmail.com>
Subject: [R-390] R392 Bandswitch & RF Deck

I am still working on the RF section of my R392 receiver. My problem is that I get a stronger signal with my signal generator from the antenna lead to E201 (grid of First RF Amplifier tube) with the Band one MC higher. .800MC strongest on 1.8MC band 2.8 MC strongest on 3.8MC band

I did find in troubleshooting that Section 2 of the RF bandswitch (S201) was reversed. I rotated it 180 degrees and it looks like it is in agreement with the positions of the other switch wafers from photos that Ihave.

The MC Band and the Crystal Oscillator MC agree. With the RF section on the 2 MC band the cams on the rear side line up per the T.O.

I seem to be going in circles trying to find the problem. Isolating Section 1 of S201 with a sig gen has the strongest signal 1 MC higher. And isolating Section 2 of S201 has the strongest signal 1 MC higher also. Since the Band MC, and the Crystal OSC, and the Cams all agree, what is causing the problem? Any help appreciated. Maybe there is something similar on a R-390A?

Date: Wed, 30 Nov 2016 20:17:40 -0500
From: "Dave and Sharon Maples" <dsmaples@comcast.net>
Subject: [R-390] R392 help

I know this is off-topic, but I have an R-392 that appears to beunmodified that I am restoring. The IF stages are not clipping even on 100%

modulation, and the audio is recovered as well as can be from the diode load point (just a bit of distortion, but nothing huge) but the audio chain is really ugly. The first AF amp (which uses contact bias) appears to be underbiased and drawing too much plate current, but all the resistances are just fine (and the contact bias cap is only 12 PF, which seems really strange, but that's what is in the schematic). Finally, the final amplifier (26A7) is boiling hot; from all I can find that is the way it is expected to work (more contact bias)!

I am highly inclined to do something with the audio. I have thought about a
couple of things:

a. Standard cathode bias on the first AF stage.

b. Standard cathode bias on the final amplifier to bring it back into its specified current draw and reduce the heat.

c. Chuck the whole mess and put in a good solid-state amplifier.

(c) makes it "non-stock" but it will sound a lot better. I am not sure I want to do that; I'd really rather leave it as it is if possible.

It occurs to me that I could do (c) and simply pull the tubes, and tell the new owner that if he wants it stock he can remove the amp and plug in the tubes. What do you folks think?

Date: Wed, 30 Nov 2016 21:36:34 -0500
From: Meir WF2U <wf2u@ws19ops.com>
Subject: Re: [R-390] R392 help

I seem to remember that on some manufacturing runs (or maybe even at maintenance depots) the audio amplifier circuit was modified to accommodate the solid-state replacement for the 12A7. If the receiver looks stock around the audio section, it may have been one of these units, except someone replaced the solid-state plug-in module with the tube.

Receivers with original 12A7 circuits sound awful when the solid-state module is plugged into the 12A7 socket without the circuit modifications.I think I may have some written information on this, but not sure - I may have just read it somewhere, without saving a copy.

Date: Thu, 1 Dec 2016 00:34:55 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R392 help

Generally speaking, the first AF amp works OK as it is -- the real problem is the 26A7 output amp. Here are two possible solutions:

(1) "Super simple" mod (re-biases the 26A7 stage). This works great if all you want is the stock power output (~200mW) with much lower distortion and tube power dissipation:

<http://www.ko4bb.com/getsimple/index.php?id=download&file=08_Stuff_Not_Sorted/8_Sept_28_2014_Uploads/R392_26A7_super_simple_audio_mod.pdf>

(2) Power MOSFET replacement for 26A7:

<http://www.ko4bb.com/getsimple/index.php?id=download&file=03_App_Notes_Proceedings/R392_26A7_MOSFET_replacement_Johnson_annotated_updated.pdf>

Finally, for reference purposes [only -- do NOT build one of these...], here is documentation on the factory "transistorized amplifier module":

<http://www.ko4bb.com/getsimple/index.php?id=download&file=08_Stuff_Not_Sorted/8_Sept_28_2014_Uploads/R392_transistor_audio_module_schematic.pdf>

The modification to accommodate the transistorized amplifier module is the addition of an 8.2M resistor from J613-1 (the AF section output) back to J613-16 (the AF section input).

Date: Thu, 1 Dec 2016 09:45:26 -0600
From: Tisha Hayes <tisha.hayes@gmail.com>
Subject: [R-390] R392 help

I think that asking questions and for help on any of the R-389, R-390, R-390A or R-392 radios fits in perfectly with this list. There are so many similarities amongst them all. I too have a R-392 that is paired with a T-195 with the modems and RTTY devices that went along with it. I even have the shock mounted bases (that are H E A V Y).

It seems to be a radio that runs quite warm and for a while I experimented with using a little DC/DC converter to boost the 24 volts that is used for B+ up to 60 volts (a module off of eBay). Results were mixed and I would of had to change quite a bit of the radio to adapt for the higher B+. In all, it is a fun, retro-radio. Even more retro looking than the R-390A's

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Date: Thu, 1 Dec 2016 12:00:58 -0500
From: Roger Ruszkowski <flowertime01@wmconnect.com>

Subject: Re: [R-390] R392 You own history.

We must remember that the R39- were never designed or built for humans to listen to. Humans do listen to these receivers a lot. In their day of leading edge technology the receivers were just a stage in a radio teletype communication link. The preferred method of data buffering was punch tape.

A receiver and a transmitter that could place a com link into operation at the push of some military grade buttons as radio propagation changed and limited resources were reconfigured hourly to establish command and control for the
leading military force on the planet, was state of the science. By the 1950's we had come a long ways since Germany managed it military command and control with a phone line and just two (I repeat two) of them Deforest tube things. (Later referred to as vacuum tubes). Good technology but insufficient quantities were available.

The R390's were RTTY mainstay communication link receivers. You only listened to it long enough to get the RTTY running clean paper. Spooks took up bad habits of doing ditty copy with them which was OK. Using these receivers on AM, just take it off the IF output or diode load and get your self some good
audio equipment. Meanwhile Enjoy the history you own.

Date: Thu, 1 Dec 2016 15:22:39 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: Re: [R-390] R392 You own history.

Of the two R392s that I have owned, the last one has what is called the Kleromonos audio mod. The audio is excellent when compared with the other
R392 and even the R390A. Elimination of several related audio tubes also reduced heat output and power consumption a lot. This is the way the R392
came into my hands. I usually like everything original but this audio is too good to take it back to original specs. I guess we all enjoy the history we own regardless of some minor mods.

Date: Sat, 10 Dec 2016 18:10:52 +0000 (UTC)
From: "Drew P." <drewrailleur807@yahoo.com>
Subject: Re: [R-390] R392 help

"Finally, for reference purposes [only -- do NOT build one of these...],
here is documentation on the factory "transistorized amplifier module"

The modification using 2 bipolar transistors to replace the 26A7 audio output tube is GUARANTEED not to work correctly. It would have large amounts of crossover distortion due to no forward bias. It may appear that the two 10k resistors to the transistors' bases would supply such bias, but the center tap of the transformer which feeds the bases is grounded and so would shunt the bias to ground. One could unground the center tap and feed in the bias there (along with adding a bypass cap), eliminating the two 10k base resistors, or better yet, just build the MOSFET version which Charles recommends.

Date: Sun, 18 Jun 2017 22:38:45 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: [R-390] R392

After many years without a hitch my R392 has acted out today. It was working perfectly, I left the shack for a while and upon returning there was a noise interfering with the signal. At first I thought it was antenna noise but it it there even without the antenna ot the audio gain at 0. The radio was turned off, I waited a bit, turned on again, everything ok for some time but then the noise came back. There is some popping before it come back so I suspect a bad cap in the audio section. This R392 has what *seems to be the Kleromonos audio mod. In fact, the audio is great. *

* If anyone has any recommendations or has experienced something similar I will appreciate your comments. I am getting to the point where hauling these BAs is getting difficult but this one is one of my favorites. Hope everyone had a great Fathers Day.*

Date: Mon, 19 Jun 2017 00:12:51 -0400
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R392

> There is some popping before it come back
> so I suspect a bad cap in the audio section.

If the volume control has no effect, the problem would appear to be in the audio section (V606, V607, V608 and associated circuitry). Bad cap is certainly one possibility, but don't forget the most common source of such problems, namely noisy contact between tube pins and their sockets. To check, just put your finger on top of each tube (one at a time) and wiggle it a little.

Date: Mon, 19 Jun 2017 06:59:41 -0400
From: Bob kb8tq <kb8tq@n1k.org>
Subject: Re: [R-390] R392

I'd put 60 year old unsoldered connection on the list along with cracked resistor. Both are a poke around a bit and listen to what happens sort of thing.

Date: Mon, 19 Jun 2017 21:45:04 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: Re: [R-390] R392

The more I hear it, the more it smells to an audio circuit problem. It takes about 5 minutes for the noise to appear after turning on the radio. After reading both Charles and Bob's recommendations sounds like a cracked resistor but could be any of the other alternatives. Tomorrow the radio goes on the work bench (in my case a small mechanics folding bench from PepBoys). I will report my findings. It's been quite a while since my last R392 repair. Thanks for the recommendations gentlemen. Highly appreciated.

Date: Mon, 19 Jun 2017 22:44:57 -0400 (EDT)
From: Barry <n4buq@knology.net>
Subject: Re: [R-390] R392

I've never owned one, but by the pictures I see on the internet, the 392 doesn't have a diode load connection brought to the outside like it's bigger cousins. If there's a similar pickoff point inside, you could feed that to an external audio amp and see if the problem persists there. Alternatively, you could take the IF output and feed that to a general coverage receiver (assuming the IF on the R392 is 455 kHz or some other frequency readily receivable on a general coverage radio).

If the problem doesn't persist listening on those alternative paths, then the problem is downstream from that point so that might at least narrow it down a bit.

Date: Sun, 25 Jun 2017 12:35:57 -0400
From: Guido Santacana <gsantacanav@gmail.com>
Subject: Re: [R-390] R392

I removed the lower subchassis, checked everything. No resistors out of tolerance and caps OK. For the first time I really went through the solid state audio mod finding out that it mostly follows Mike Dinolfo's design. Nothing seemed wrong here either. All tubes were tested and reseated in their sockets with Deoxit on the pins. Same thing with all connections. The subchassis was reinstalled and the radio had a run of several hours without any problems. I will give it another run today before returning it to the case and if everything is OK then the conclusion is that the noise came from some bad connection. It could have been induced by heat. The

day that the problem occurred was a specially hot one. From now on I will slide it out to allow better cooling. Thanks to all of you for your recommendations. They will go into my notebook where I keep repair notes of all my BAs. BTW, this is the only BA in the shack that my YL likes!

Date: Sun, 25 Jun 2017 12:42:23 -0400
From: Bob kb8tq <kb8tq@n1k.org>
Subject: Re: [R-390] R392

The 392 runs hot even under the best of conditions. On a really warm day I shudder to think how hot it must get in there. Hope you found the problem !!!

Date: Sat, 14 Dec 2019 02:28:46 +0000
From: David Olean <k1whs@metrocast.net>
Subject: [R-390] Help needed for two R-392s

I purchased three R-392 receivers at auction. My plan was to restore them and get them working and then sell them to help pay for the one or two receivers that I want to keep. I ran into a significant roadblock when I opened the first R-392 and noticed that all three slugs from the 2-3 MHz variable IF were missing. I opened the second unit and was horrified to find that the entire 2-3 MHz IF tuning rack was missing along with the slugs. The third unit did have the 2-3 MHz parts and I fired it up and have it running pretty well. The PTO is off by 4.2 kHz which isn't too bad. There are some dirty switches but it looks like I can get unit #3 working again.

I looked around on E Bay and see no modules or components from the R-392 for sale. I am hoping I can find some parts to get at least one of these receivers working. So my question is Does anyone have any R-392 parts units that they would be willing to remove the 2-3 MHz rack and slugs What really bugs me is that the unit that is missing the three slugs looks pristine inside. It is gorgeous! Needed are two sets of slugs, one 3-2 MHz rack and the two springs that guide the rack on the cams. I hope someone can help. I enclosed a picture of the 2nd variable IF slug rack and its location in the upper left.

Date: Sun, 15 Dec 2019 21:46:20 +0000 (UTC)
From: Roger Ruszkowski <flowertime01@wmconnect.com>
Subject: Re: [R-390] Help needed for two R-392s

Dave, Welcome to the R390 group. No one has a model that covers cost and has a return that exceeds the aggravation on the investment. We are lucky anything is on ebay. Those of us who have stuff know whereto find

and read our sales leads. We hope to collectively keep a large enough stall open that serves a niche in the online market for the Amateur Radio Community. Please ask here for parts and the text is free. Ask for troubleshooting help and receive awesome knowledgeable help for many experienced Amateurs who share a hobby interest or better with you. Needed for an R392 are two sets of slugs, one 3-2 MHz rack and the two springs that guide the rack on the cams. The exchange of parts happens one on one and we will not seethe offers and the deals you make for parts. The transactions in front of everyone has no reading value. I do not know the R392 as it was a field radio not used in my units. Dave you may have parts in hand to put two of the three back into full operation.Six slugs two springs and a rack gives receiver three a full chance. The springs are common and those are topics in the R390 pearls of wisdom.I do not know that the 3-2 MHz rack is unique. The same rack may be used in other octaves. The R390 and R390/A use a left and right rack part a or part b. You may be able to swap a rack from another octave.like 8-16. The slugs may be the same as the 0-2 or 4-8 slugs. Looking at the racks you will see if another rack will work.The parts manual will help you locate the slugs in the receiver that are the same. You may have parts in hand and just do not know it yet.Both the R390 and R390/A only used two types of slugs in the RF deck and a third type in the variable IF tuning sections. If the slugs will fit the 4-8 slugs will almost peak well in 2-4.Thus some part of the octave will be good and the other end not so good.But the receiver is not chopped up and operates. The exact value of the core slug is not critical.We would like the core material to exhibit the same flux value across its intended range of operation. Any slug in the receiver meets these property requirements. The cam holds a mass in an RF field. As long as the cam holds the same mass with the same flux at the correct distance within the field the distance can be set and the mechanism will tune and track as well as the coil winding allows. The change in core material is to cover the operating span with a linear core material. The goal is a flat response transformer.No one core mix is equal across 32 Mhz. As long as more than one material mix is needed pick the best divisions and mixes for the divisions. Part redundancy and minimum parts were design requirements. We know the R392 slugs are unique mechanical sizes. We need to get you into theR392 parts manual where you will find a part number for the slugs and all the other places in the receiver where the same part number is used. Time, color, paint dots, springs, spline size, and glue have all changed, but the tuning slug parts are identical in fit and function and work as required by design specifications. We have learned you can not look at a part and know if it swaps. A lot more parts are the same than look the same, but you need a program to follow the game. Get a slug loose on the bench and no one remembers where it came from and they almost never get recovered and returned to service. History is parts and like a parts manual each part has an index part number, noun name nomenclature,item description and reference to all location where the

part is included in the units design. Any NATO part in the 5960 part number system has a vacuum. Vacuum management is required for a part to be properly indexed into the 5960 class. Over seas the missing octave is AM long wave broad cast around the Amateur 3.5 to 4 Mhz 80 meter band.Allocated military does not include this range of operation. The slug were pulled to keep the local nationals from using their U.S. Military resources to listen to the radio while on duty. A common but not documented operating procedure in some units. As you switched the Mega hertz the local broad cast station did not knock the cans off your ears every time you crossed the mega hertz no matter what the kilo hertzVFO was indicating. The band was broadcast noise and disabled for local operating convenience.A jail house window screen and an R-390 had been used to log WBZ Boston was at over 200 mixed frequencies at Fort Devens Mass. about 50 miles from AM broadcast tower to the window screen on the second floor. It was a class room demonstration of the receivers sensitivity. Name the frequency and look up the station that is mixing with WBZ Boston on a rusty fence post some place and being received quite clearly on the receiver. Students training to fox hunt enemy transmitters, were given jeep units and did field exercises looking for the source of the mixed and reradiated energy. The students drove all over the area and found every day mechanical structures were solid state oxide diode mixers with some what tuned antenna lengths. It was common to disable a band on receivers. Keep asking for parts with a paragraph until you have the parts you need. The parts are not free. Many of the Fellows who have a hanger queen and are parting it out do not read every mail and miss requests. Fellows, Does the R392 have a reflector page like the R390 page Does the R392 have a document web site like the R390.net page The R392 owners need to be populating the R392 page with copies of the military manuals including the parts manuals. The R389's would like equal consideration.

Date: Mon, 16 Dec 2019 13:00:56 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] Help needed for two R-392s

thanks for the long and thoughtful note, Roger,

Well I know I can get all three receivers working. Fortunately, only one tuning rack is missing and I have located another RF deck (on EBay) for the R-392 thanks to this list! With this parts source, I can get the two RXs working. The EBay RF deck has the rack and slugs for 3-2, and I am sure I can match some other slugs with similar permeability that are already in the RF deck. The low frequency RF banks are probably the same mix or close enough to work as you described. When this is all done, I will have plenty of slugs, coils racks and cams available for others should more missing parts show up on the list! The 3-2 Mc variable IF

rack is unusual as it is two rows of coils in tandem to fit in the available space, so it is a "mongrel" unlike any others in the 390 series or in other portions of the R-392. I figured that if worse came to worse, I could fabricate my own slug rack. I have an engine lathe and a non Bridgeport milling machine. I have made parts before for other repairs. Fortunately this RF deck should solve my problem.

When I was in the Signal Corps during the Vietnam War, my signal battalion had R-390As as well as the R-392s. (AN/GRC-26D used two R-390As while the AN/GRC-19 used a T-195 and the R-392 for the receiver.) For a significant length of time, I was the battalion S-4 and signal maintenance officer and I was directly involved with all the gear making sure it got fixed. The 390s and 392s hardly ever needed work. What I found was that the higher echelons of maintenance (3rd) did a fairly lousy job for us. As a result, our work involved repairs that were really out of our bailiwick, but we did them out of necessity.

So here I am 50 years later and I am working on R-390s and R-392s again. It feels funny but good!

I was not aware that bands were disabled on some radios. A few of my ham friends had mil careers as intercept operators overseas. All of them spent time listening to USA AM BC stations when the NCO was not looking. In Europe, WKBW in Buffalo and WBZ in Boston were favorites. They played rock and roll music back in the day. Creedence Clearwater Revival sure beat 5 letter code groups. The rhombics picked them up pretty well. Disabling coil sets would definitely curb that activity.

I have one R-392 already working just great with super sensitivity on all the bands. The AM BC band is especially hot. Receiver #2 has three missing slugs in the 2nd variable IF at 3-2 MHz. I can tell the receiver will work because a strong signal will still get through that variable IF without the slugs. It picks up all the bands, but needs a loud signal to get through. I could even check the PTO end point just by picking up the signal generator across the band. It is off about 6 kHz. Receiver #3 does not work, but the IF strip works fine. I must be missing an oscillator or have a bad tube, but it sure looks like nothing much is wrong. It draws the correct current, A few minutes with a scope and I should figure out what is missing. I'll bet it is the crystal bank.

Thanks for all the help.

Dave K1WHS

Date: Mon, 16 Dec 2019 18:35:13 +0000 (UTC)
From: Roger Ruszkowski <flowertime01@wmconnect.com>

Subject: Re: [R-390] Help needed for two R-392s

Dave, I have helping fellows get their R-390's back on line since 1991after starting school in 1968. Other Fellows report we are infected and there is no cure. Amateur Radio can be a shocking hobby but we are suppose to work safely. Nice Deal on the RF deck. I still do not know but it may have slugs in another rack that are the same parts and you have parts for both receivers. When you get to it, you will pull number three apart for inspection, put it all back together and it will come back to life. Oxide in a plug or switch contact from setting. Loose tube in a socket from shipping. I say this because this is now this equipment behaves. Keep enjoying it. I understand what you are saying about depot maintenance. Every soldier one out of school had the knowledge to do the jobs well. Some did not have the skill to hold a screwdriver. Some of the guys got with it and were good maintenance men. A fair share of my shop manpower on any day were not doing their jobs and I had them framed out to the house mouse activities we also had to keep up. You do not get to leave tubes glowing blue in equipment returning to service, or toss the tube shields in the trash because you forgot to put them back in. Problems I can write about in 30 words or less. The soldiers knew better and wanted a pay check, meals, laundry, house-keeper, transportation to and from work, and nothing to do all day but shoot the breeze. Could you just make sure you were giving a fellow soldier a unit that is up to snuff and works because peoples lives do depend on it some very directly some not so direct ways. I was happy these guys were not my mess hall cooks or delivering my mail. You can not go back and have a do over on the ditties that you missed and did not copy. The guys on the bench thought maintenance was in a way a property book activity. Yes sir, that thing is still here somewhere. Do we need to find it for you, Sir. People problems beat hardware problems every time. I will go for the leadership position every time I walk in a room. Today we call it a six-sigma behavior. Thank you for sharing your R-392 with us. We know the group had another Fellow, and he happens to be nursing three on the bench. Others are finding the parts and help they need to keep some good equipment operating as educational material. How else do you want to explain our behavior.

Respectfully, Roger Ruszkowski AI4NI

Date: Wed, 18 Dec 2019 23:38:12 +0000
From: David Olean <k1whs@metrocast.net>
Subject: [R-390] A surprise when I opened my R-392

See the photo attached. I had an audio section in my R-392 that needed work. (The whole thing needed work!)? I was getting leaky capacitor sounds in the audio, so I took the modules out of the R-392 and was very surprised to see the "note" written in blue magic marker. Obviously the

repair was done during the Vietnam war. It brought back a lot of memories from my time in the draftee Army during the late 60's . (I was not a draftee).

As for the R-392, it is getting better. Someone had messed up the synchronization of the gear train, Veeder Root counter, the PTO etc. I went back to the beginning and reset the counter, checked all the cams and tweaked them back. Then I adjusted the Oldham coupler so that the PTO would read correctly. When I was done, my brain hurt!

Date: Thu, 19 Dec 2019 01:19:16 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] [MRCA] A surprise when I opened my R-392

I think you missed the F.T.A. part, but that's OK. The audio, IF and Calibrator assy came out quite easily. I started checking some capacitors in the audio assy. A coupe of Vitamin Q caps tested 100%. Then I got to some GE 0.1 MFD ones. Out of five units, all were leaky. My ESR tester said 42 ohms ESR and about 6% loss. I hooked them up to a DC supply and huge amounts of DC leaked thru. With 100 VDC on one side of the cap, I saw 45 volts on the opposite side with my Fluke DVM. I chucked em all, and now the audio stage is quiet and working just fine.

Date: Tue, 24 Dec 2019 00:20:20 +0000
From: David Olean <k1whs@metrocast.net>
Subject: [R-390] The R-392 saga

I have been working on a few R-392 receivers and found some interesting things. I think I already mentioned finding the message inside of a disgruntled repair tech from the Vietnam era. That was pretty funny. That "F.T.A." unit had so many things wrong with it, I was wondering if I ever would get it finished. Well, today, I think it is done. The last problem was having the crystal calibrator being on all the time. Whenever I would dig into the radio, the problem would disappear only to come back as soon as I tried to put things back together. This radio had some serious mechanical problems with tuning racks as well. Two of the racks would jam, while the 2nd variable IF rack was missing. I found replacement parts and fixed the 2nd variable IF (3-2 MHz) only to find that the 4-8 MHz RF coil rack jammed along with the 8-16 MHz rack. The 4-8 problem was that the width of the channel that the rack slides up and down in was only 0.261" wide, while the sliding part of the rack was also 0.261" in diameter. It would get stuck. The 8-16 MHz guide was 0.264 wide. All the others were 0.267 or so. I wonder if the chassis had been slightly bent due to rough usage.

My solution was to get some fine emery cloth and stretch it over a thin

flat metal bar. Then I could slide the emery cloth up and down on the rack guide opening to enlarge it slightly while maintaining a flat and smooth surface for the guide to work with. The 4-8 rack started working great once I got the width to about 0.264 or 0.265". The next rack still was hanging up and I finally figured out (after enlarging it so the rack would slide freely, that someone had the wrong spring installed there. It looked OK, but had way too little force when stretched. Thank goodness I had a junker RF deck to pick new parts off. A new spring fixed it right up.

Once the racks all worked fine, I did a final alignment of all the coils and noted that the calibrator still was always on! I suspected a bad bypass cap in the cathodes of the calibrate circuit, but everything checked out OK there. When I looked back at the mode switch that turned on the calibrator, it worked fine. I then removed the upper deck assby with AF, IF and calibrator chassis and powered it up on the bench without the rest of the radio. I used some bench supplies to power filaments and the 28 VDC "high" voltage. It all worked fine. The oscillator came on only when I grounded the proper pin in the connector. I think it was Pin 4. When I put it back together, it quit and looked shorted out now all the time. I dug around and determined that the cable harness and 20 pin plug were at fault. I took the plug apart, but all looked great inside there. That left the harness all by itself! Upon close examination, I found that a previous repairer had positioned the harness too close to the gear train at some point, and the gear teeth had chewed through the outer plastic wrap on the cable and actually had dug into two shielded wires, cutting the outer shield as well as the insulation inside to expose the center conductor of the shielded wire. It happened a long time ago, as I could see green copper oxides from corroded flakes of copper that stained the harness. This was all hidden on the underside of the harness and was almost invisible. My solution was to carefully pick out the two damaged wires and remove any wisps of braid from around the bare wires. It took me a few attempts, but eventually, I got it so that any shorting action was gone. Then I sealed everything up again with liquid electrical tape. This is a black plastic coating that dries to a glossy rubbery consistency and will keep any wisps of braid away from the center conductors. From there, it was a simple matter to rebolt the harness down and put the front panel back on the radio. I had no desire to change out the wires in the harness. I think the liquid tape idea will work out OK. I have used it before where harnesses have been burned by errant soldering irons. I can make my own insulation over the exposed wires!

I swapped out a bunch of GE 0.1 MFD caps in the audio section. They were all leaky and making noise. Now the R-392 IS HOT on all the bands. I can easily pick out a weak -140 dBm signal on CW, so it is very sensitive. I

did notice that it gets overloaded by strong BC stations at night. If I listen on 1.8 MHz for ham signals, I can hear all sorts of BC band artifacts. It isn't too serious, but it does get overloaded. Still, it is a joy to listen to AM broadcasts in the 8 kHz bandwidth position. All three of my R-392s are early Collins Radio units from the first contracts.

Date: Tue, 24 Dec 2019 17:41:37 -0800
From: Larry H <larry41gm@gmail.com>
Subject: Re: [R-390] The R-392 saga

Dave, thanks for letting us know about the humor and problems you found in your 392's. I was not in the Army, but assume that 3 letter acronym was in reference to it. Are you going to leave it in there? Nice work on the repairs. I've heard about the liquid tape, but have not tried it. Where did you get yours? My 1st encounter with low voltage plate tubes was when my Mother got a 1960 Chevy. The factory radio in it had 12 volt plate tubes in it. Before this, I know about sub-miniature hearing aid tubes that would operate on 22.5 volts. The lowest voltage miniature tubes were 45 volt. I was just learning about electronics and did not think it was possible. Well, come to find out that is why they short out easily. Are the 25 volt plate tubes more rugged? I hope so.

As for overloading, I don't know if that is normal or not - I would think not, but do not know. Perhaps the agc is not working quite right. Or the IF gain is set too high. Is the overloading causing audio distortion due to the 5th or 6th IF from being over driven?

You sure did fix a lot of problems. Good going. Regards, Larry

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Date: Wed, 15 Jan 2020 18:39:13 +0000
From: David Olean <k1whs@metrocast.net>
Subject: [R-390] Working on the R-392

Hello again! I have been restoring a few Collins R-392 receivers. The first two units were not much trouble. All required tweaking the PTO and alignments. One had a difficult problem that was traced to a gear cutting into the main harness and breaking wires!? R-392 number three, though, has taxed my brain to the point where I have totally confused myself and have turned into a babbling idiot, banging my head against the wall and drooling uncontrollably.

The basic problem was an inoperative AGC system. I also was hearing some crackling noise coming from the RF amplifier circuits that indicated a failing part somewhere in the RF signal chain. This particular unit was not employing 12AU7's, in V601 and V-602, but had small diodes stuck in

the tube sockets instead. At one point, I had the thing working, but it was short lived. So my problem was intermittent. Measuring negative AGC voltages at J-614 (the black test point) showed very little change between weak or strong signals. strong AM BC stations sounded very distorted. I looked around the AGC amplifier and saw that it was amplifying just fine. I saw no leaky caps in the AGC buss that might bring down the AGC levels. Being a closed loop system, it was difficult to figure out where the problem was. I had better luck poking around trying to ferret out the intermittent problem. At one point I suspected the third IF stage. I dug into the IF strip and checked each capacitor. They were all Sprague Vitamin-Q hermetically sealed caps. None of them checked bad. I saw one cap that indicated it had some leakage. When I removed it and tested it again, it checked fine. I replaced it anyway. My capacitor checker is new to me and cost $12. I am not sure that I trust it. It does test for ESR. I reverted to my old method of applying a variable high voltage to one lead and measuring any DC feedthru on the other lead with my Fluke high impedance DVM. All the Vitamin-Qs had absolutely no leakage.

One area to suspect would be the coupling caps from the plate of the AGC amplifier, C-630 and C-632 that connect to the rectifiers. They were both fine. Another suspect cap would be C-638 in the cathode side of the two AGC rectifiers. I had the correct voltages here depending on whether I used AGC ON or AGC OFF settings: 5 volts, or 25 volts on the diodes, so I know the cap was not shorted, but I placed another 0.01 cap across it and the AGC voltage climbed a bit. Maybe it had lost its value and was not directing the RF signal to ground? I removed the part. It checked fine. (?) A new capacitor there helped slightly.

I also had a strange symptom going on with the RF level meter. As I would tune the KC dial through a strong signal, the meter would climb very high, then drop down as the signal was centered in the passband. It would climb again as I continued and the signal started to exit the passband. I would see a corresponding change to the AGC voltage in step with this.? For the life of me, I could not imagine what was going on to cause this.? At this point I was drooling and banging my head against the nearest hard surface. I also had a small pile of perfectly good Vitamin-Q caps on my bench.

At some point, as previously mentioned, I noticed some intermittent but horrendous noise appearing in the signal path. It was being generated inside the radio. It sounded like a noisy capacitor. I unplugged the IF input BNC connector and the noise went away. It was definitely in the RF stages. After a short while, the noises stopped. It was only then that I noticed that the AGC problem and the RF noise was only on one band! I changed bands from 1-2 MHz and went up to 5 MHz and listened to WTTW

on 5.085. Lo and behold the audio was not distorted and the intermittent internal noise was gone too. Interestingly, I was seeing similar sensitivities and meter levels on both bands. Receiver gain had not changed much. Further checking on 0.500-to 1.000 MHz also showed no noise, so my noise problem is confined to just the 1-2 MHz band coils. For some reason this is also affecting the AGC just on that band. AGC voltages at J-614 are much higher on all other bands than I am seeing on 1-2 MHz.

I immediately stopped drooling and banging my head against hard objects. Now I know where to look! I can isolate the offending part by using the E test points and a sensitive O-scope. I celebrated my good fortune and set things aside for awhile.

Incidentally, I wanted to paint my three cases with a nice gloss OD color as they were a bit scratched up and worn. One was really bad. Being a member of the US Army for a few years, I was aware of the army culture. One phrase often heard was..." If it moves, salute it! If it does not move, paint it!" This bad R-392 case had been painted multiple times with so many different OD hues that it was a mess.? The paint was just glommed on and very thick. I ended up stripping it and sanding it down to bare aluminum. I primed it with some gray primer and let it sit for a week. Then I used my new HVLP paint sprayer system and applied some special formula Sherwin Williams paint. The following is the formula that I ended up with. It is still a bit dark and needs to be lightened up to 'look' a bit more green.

Sherwin Williams INT EXT Architectural oil based. Gloss
Olive Green Equipment
BAC Colorant? 32 OZ
W1 White? 5
B1 Black? 59
R2 Maroon? 3
Y3 Deep Gold? 18
Y1 Yellow? 7

I really am liking the R-392. It is very sensitive and makes a great AM BC radio. I can hear a CW beatnote with a -140 dBm input signal! I fixed up the last of the three 392 PTOs. I had built a PTO test fixture for the 75A4 and 51J4 type PTOs. It has a nice vernier dial with gear reduction so that I can measure the linearity quite easily. I did rework my 51J and 75A4 PTOs and it worked just fine.? had to modify my test fixture again when I started working on R-390s and R-390As. The mounting arrangement was different and I needed two DC voltages. Then I got to the R-392. Yikes! It had a very weird mounting arrangement. Look Ma, no screws at all! There was no easy way to mount it in my fixture, so I

winged it by removing the PTO from the radio, and placing a black dot on the oldham coupler with a small magic marker. Then I would crank it around for ten turns and see how close or far off I was. Of course there was all sorts of parallax in trying to line up the black dots. I would sit there and squint and guess at how well things were tracking. It was amazing that I got them pretty close and within about 300 Hz in all three cases. I also bought a $5 PTO on E Pay from K1ANX just to play with. It was advertised as being DOA, but repairable. The RF cables were cut on it, but I was surprised to see that it actually worked when I applied voltage to it. I was also able to reset the end points so it is within 300 Hz as well. So now I have a spare!

Anyway, I am sure there are many stories about screwed up AGC circuits in the R-392. I am also looking for a carrier meter. I see plenty of R-390 VU meters on EBay and elsewhere, , but never the 17 ohm 1 ma carrier meter. I sure could use one on one of the R-392s. Dave K1WHS

Date: Thu, 16 Jan 2020 07:17:03 +0000
From: David Olean <k1whs@metrocast.net>
Subject: [R-390] Working on the R-392

I finally figured out that my severe distortion was only affecting one band. Any strong station in the BC band between 1 and 2 MHz was distorted. It was interesting that stations between 500 and 1000 kHz were fine. I had originally thought that my AGC circuitry must be bad. I traced the problem to some noise coming from the tuned coils after the first RF stage. I used a dual trace scope to ferret out the noise and used the R-392 RF stage test points for connecting the scope probes. The correct one with noise was Z-208. I took the tuning rack apart and removed the RF coil. Inside were a couple of silver mica postage stamp caps and the coil. I tested each cap with a Fluke DVM. each cap showed infinite resistance. I put some DC voltage across the 2000 pf postage stamp and saw almost all of the DC voltage show up on the other end. It was shorting out. At first, I thought I hooked it up wrong. I couldn't believe my eyes. It was leaking so badly, it was almost a complete short at 50 volts. I then tried low voltage across it, and saw the cap worked fine up to about 8 volts DC. Then a little DC started to leak through. It was only when I ramped things up to 12 or 14 volts and then it broke down and allowed almost all the DC voltage to pass through! What was strange was that I could blow on the capacitor and the leaking voltage would drop to almost zero! This was shorting out when strong BC stations were going through the RF stage. No wonder I was having problems. I only found it due to the static noise it was making occasionally as it was sitting there in the circuit.

So all the Sprague Vitamin-Q caps were fine, and it was a silver mica postage stamp type capacitor inside an RF transformer that was giving

me grief!

Date: Thu, 16 Jan 2020 03:06:01 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] Working on the R-392

> So all the Sprague Vitamin-Q caps were fine, and it was a silver mica
> postage stamp type capacitor inside an RF transformer that was giving
> me grief!

In the ~60 years I've been playing with radios and other electronic gear, I can only recall finding one bad Vitamin-Q -- and there is a very good chance that one was damaged by the “hoe” who tried to fix the radio before me. [For those who haven't heard the term before, "hoe" refers to someone who leaves electronic equipment looking like it was worked on with garden tools.] By contrast, postage-stamp micas are dying like flies now. The time is nearing -- if it isn't here already -- when they should be replaced shotgun-style, like plastic-cased paper caps. Epoxy-dipped silver micas have generally been very reliable unless they had spent time underwater, but old ones have started to show EOL failures over the last 20 years or so. I expect this trend to accelerate as they age further.

Date: Thu, 16 Jan 2020 16:16:52 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] [MRCA] Working on the R-392

I live in Maine and heat build up is not a great problem here. The joke here is that our summer runs from July 1 thru July 6. I have run my R-392s in their case and temps seem OK. If I lived in SC or Florida, I might come to a different conclusion. I actually had a MIL 26A7 SS replacement that I inherited from my army days. I sold it on EBay before I ended up with three R-392 receivers. Two of the R-392s had small diodes in the 12AU7 tube.sockets. I left them there except that I fitted gold plated pins from a DB-25 plug to each diode lead for a 100% positive fit to the tube socket. Maybe I will replace the audio amp at some point. You are sure right that it does get warm.

I saved the little 2000 pf mica cap for posterity. It was a good learning experience for me. Looking at the circuit, it was in the 1st RF output stage. It had 28 volts DC on it, but the capacitor was floating and not referenced to ground. The only voltage across the capacitor was that developed by RF signals and the plate swing of the 1st RF tube. I'll bet there are plenty more of these silver mica caps getting ready to quit.

Date: Thu, 16 Jan 2020 16:31:40 +0000

From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] Working on the R-392

Thanks for the comments, Charles,

Yes, I think I will be replacing many of those postage stamp types as time goes on. I like the term "hoe". Many of the rigs I have been restoring were obtained from Land Air Communications. I am not sure if the previous work that I have seen on this gear was done there or the units were like that when Land Air received them. All I know is that the work was shoddy and I spent much time undoing damage caused by previous repairs. Garden tools sounds about right. Another term that I recall was from Glen, K1GW who described his repair acumen as akin to using blow torch and boxing gloves.

Date: Thu, 16 Jan 2020 18:03:55 -0800
From: Larry H <larry41gm@gmail.com>
Subject: Re: [R-390] Working on the R-392

Dave, Nice work. Thanks for letting us know what and how you found it. It's good to hear the blow by blow story. Sadly, I have been relegated to fix the noisy bath exhaust fan. I'd rather by R-390(x)ing.

As Charles said, we are seeing more and more silver micas bite the dust.

Date: Fri, 17 Jan 2020 02:16:05 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] [MRCA] Working on the R-392

> Maybe I will replace the audio amp at some point.
> You are sure right that it does get warm.

Getting rid of the heat is certainly a good idea, but an even better reason to do something about the 26A7 output amplifier is that it improves the audio quality by about a million percent.

There is a very simple modification that works extremely well, my "super simple audio mod." Documentation is posted at <http://www.ko4bb.com/getsimple/index.php?id=manuals> [file name "R392
26A7 super simple audio mod.pdf"]. Whether you want to do this mod or not, it may be worth a read -- this file explains what is wrong with the existing 26A7 amplifier and why it sounds so very, very bad. The best fix, IMO, is to replace the 26A7 with two power MOSFETs as drawn by someone named "S. Johnson" in 1991. That schematic, with my annotations, can be downloaded from

<http://www.ko4bb.com/getsimple/index.php?id=manuals> by searching for the file named "R392 26A7 MOSFET replacement Johnson annotated updated.pdf." [NOTE: there is an older file posted there that does NOT have "updated" in the file name. You want the updated file.]

An annotated schematic of the stock audio amplifier is posted there as well, for reference [file name "392 audio amp schematic V606 607 608 annotated.pdf"].

Date: Fri, 17 Jan 2020 13:45:07 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] Working on the R-392

Well, the project isn't quite over. I have noticed that the AGC sags as the set warms up. A -25 dBm BC signal will drive the AGC up to about -2.7 volts, but after an hour or so, it only rises to about 1.7 volts. I checked two receivers, and both are doing the same thing. It must be a leaky cap. I need to buy some freeze mist to find it. If the AGC sags, I start to hear a bit of distortion on strong signals.

Date: Fri, 17 Jan 2020 14:01:35 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] [MRCA] Working on the R-392

Thanks. That looks great. I'll build one up, as I note that the audio is a bit muddled with the 26A7.

Date: Tue, 21 Jan 2020 02:35:41 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] Working on the R-392

> Thanks. That looks great. I'll build one up, as I note that the audio is
> a bit muddled with the 26A7.

List member Frank Hughes posted links to photos of his version back on 4/4/15. He used an octal base with a popsicle stick to support the MOSFETS. Unfortunately, the links are dead now and I forgot to save copies of the photos. Building it into an octal base (octal plug) makes everything easy, and completely reversible. You will be thrilled at the improvement it makes in the audio.

Date: Sat, 21 Mar 2020 21:32:07 +0000
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] Z-503

I have been digging around my R-392 since mid February!

I was not sure how to progress with checking the AGC system, so I came up with a simple test.? The radio was distorting on strong stations after some amount of warmup time.? From memory, I think I was seeing -2.15 volts with about a -40 dBm input signal if things were sort of OK.? So what I did was couple in some negative voltage thru a 470K resistor into the AGC (black) test point.? I set the supply voltage to about 2 volts, and then went to each stage controlled by the AGC to see what ended up on the tube grid, pin 1.? This would test all of the bypass caps in the AGC line. I could also see any current draw in the AGC system by monitoring the voltage drop across my 470K resistor. There is a 1 meg resistor to ground in the AGC circuit.? I saw just about -2 volts at all of the tube grids. This told me that all those Vitamin-Q caps in the AGC line were working well.? The only other area had to be the IF amplifier.

I focused on the IF amplifier chain, looking at stage gain. When I got to the 2nd stage, it looked like gain was not that great. -70 dBm antenna input produced 140 mv on the grid of V-502. -50 dBm was about 3 volts peak to peak, but I noticed that when I pulled out the tube, the voltage soared. With little AGC voltage available, this surprised me and I figured that something was severely loading down the input circuit.? Looking at the schematic I could see a 1000 pf capacitor across the primary of the IF transformer.? I could also see that there was some jitter with the rf voltage jumping around a bit in V-502 on the grid and the plate, but it was fine in V-501.? I suspected that one of the silver micas was shorting out and loading down the circuit.? I took apart the 2nd IF can and disconnected the capacitor and it tested fine on two? different (cheapy) capacitor meters. It had the correct value and showed no leakage. I then applied 250 volts DC and measured about 0.20 volts DC leaking through it. I also tested the suspect cap with my newly acquired GenRad 1657 LCR meter. Without putting DC bias on the part, it checked OK with no leakage. I need to fab up a fixture to get at the four test terminals rather than just two, on the 1657, so I can apply DC voltage across the cap, or I? am going to miss all these caps. Other caps in the transformer were tested as well. I replaced the postage stamp cap with a new 1000 pf silver mica, and now everything is working again. I re aligned the IF stages since I messed with all those caps in the IF can, but it was still pretty close after all the work.

Now the IF stage tunes the same whether the signal is weak or strong. With a flakey cap in the signal path, gain drops as the signal gets stronger.This impacts how much AGC volts get developed.? I get the same single peak in the pass band, whether weak or strong now. The distortion is gone. Only at about -10 dBm does the AGC fail. That is good enuf for me.

Out of three R-392s restored, I am keeping just this last one. I have the PTO done up pretty well and accuracy is +/- 200 Hz or so across the whole band. Sensitivity is fantastic on all bands. Its a keeper!

I have a feeling that these SM caps are going to be a pain in the future. They are all giving up now!

Date: Sun, 22 Mar 2020 23:05:02 +0000 (UTC)
From: Perry Sandeen <sandeenpa@yahoo.com>
Subject: [R-390] Re R392 caps

<snip> I took apart the 2nd IF can and disconnected the capacitor and ittested fine on two different (cheapy) capacitor meters. It had the correct value and showed no leakage. I then applied 250 volts DC and measured about 0.20 volts DCleaking through it. I also tested the suspect cap with my newlyacquired GenRad 1657 LCR meter.

You've discovered what I posted on the reflector before. You need something like a Sprague TO-6 or similar that uses B+ for testing or if your really, really cheap (and lucky) you could use the B+ from a receiver to do thee same test.? There should be no voltage on the open end. <snip> I have a feeling that these SM caps are going to be a pain in thefuture. They are all giving up now! Yes. Dan's Small Parts. Shotgun now or string out the misery for years to come as these caps are old enough to get full Social Security benefits. Sadly, there still is no free lunch.

Date: Thu, 18 Nov 2021 06:26:19 -0500
From: Mack McCormick <w4ax.mack@gmail.com>
Subject: [R-390] TM 11-5820-334-34P Parts Manual R-392/URR

The pictures in my scanned copy of the R-392 manual (purchased on eBay) ar really bad so I scanned better pictures from the parts manual.
Here there are in case you find them of use:
https://drive.google.com/file/d/1d53rgD6hedQsF78SUjfBrxek8ZlEboj_/view?usp=sharing

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Date: Thu, 18 Nov 2021 15:40:03 -0500
From: Mack McCormick <w4ax.mack@gmail.com>
Subject: Re: [R-390] TM 11-5820-334-34P Parts Manual R-392/URR

Try this link instead.
https://drive.google.com/drive/folders/1tjtywBTR0EoAuiRnkUK512QM6cUhnqNv

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Date: Sun, 21 Nov 2021 10:22:00 -0500
From: Mack McCormick <w4ax.mack@gmail.com>

Subject: [R-390] R-392: My solution to replacing the final audio output tube

I developed a solution to replace the final audio output tube (26A7) on the R-392. Very simple using off the shelf components. This mod (completely reversible) removed a LOT of heat from the radio and reduced the 26VDC current draw significantly. I used a voltage regulator to reduce the voltage from 26VDC to 12VDC which the LM386 requires.
https://www.amazon.com/gp/product/B076H3XHXP/ref=ox_sc_rp_title_rp_9?smid=&pf_rd_p=823698fb-5325-4f6f-9cdd-b754ea810772&pd_rd_wg=5Crpb&pd_rd_i=B076H3XHXP&pd_rd_w=JlgkA&pd_rd_r=e5ed6b98-d679-47bb-921b-f2591173452a&th=1

I piggybacked a LM386 audio board using 3M Industrial double stick tape. Also provides insulation. Here is the LM386 board that I used.
https://www.amazon.com/gp/product/B00LNACGTY/ref=ppx_yo_dt_b_asin_title_o07_s00?ie=UTF8&psc=1

Using an octal male connector I pulled GND from pin 2 and +26VDC from pin 4. I connected the input of the LM386 board to pin 3. I bypassed the audio transformer by opening J613 (the large multi pin connector) and removing the wire from Pin 1 of the connector. I spliced a separate wire to the wire that was on pin 1 (properly insulated) and routed that externally out the top of the jack to the output of the LM386 board. (this mod is easily reversible). It provides loud volume with the audio gain pot at about 1/3 rotation.

Here are pics and a short video:
https://drive.google.com/drive/folders/1-1xs5d_ZGLULcxHcTsYHfyY8816RZwv_?usp=sharing

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Date: Sun, 21 Nov 2021 22:15:29 +0000
From: Gordon Hayward <ghayward@uoguelph.ca>
Subject: [R-390] R-392 26A7 replacement

I used the MOSFET replacement designed by S. Johnson using a pair of IRF510s. It's on a small board mounted on an octal plug. No modifications to the radio at all - it just plugs in in place of the 26A7. It works like a charm.

Date: Sun, 21 Nov 2021 19:27:58 -0500
From: Charles Steinmetz <csteinmetz@yandex.com>
Subject: Re: [R-390] R-392 26A7 replacement

This is BY FAR the best solution to fix the R-392's audio. The circuit with my annotations is posted to Didier's site. It is ultra-simple and can (should) be built into a tube base so it is 100% reversible.

Go to: <http://www.ko4bb.com/getsimple/index.php?id=manuals>
Search for: r392

Follow the link to download the file named:
"R392 26A7 MOSFET replacement Johnson annotated updated.pdf "

> From: *GIOVANNI BECATTINI via R-390* <r-390@mailman.qth.net>
> Date: Wed, Jan 5, 2022 at 6:15 AM
> Subject: [R-390] R-392, IF stage gain

> I am sure a little bit pedantic and tried to check if my R-392 (1951,
> Collins) fulfills the IF stage gain chart (par. 104 of TM 11-858). I
> started from this point a long sequel of tests and component
> substitutions, with some obscure behavior.
>
> First of all: how do you do the tests? The manual is not precise about
> that. They say to apply the siggen output thru a 50nF capacitor. But
> in this way the generator output impedance is not matched, so, when
> you think you apply n-microvolts, you are really applying the twice
> and the value of the table are widely exceeded. So I simply multiplied
> by two the nominal output values of the signal generator.
>
> In this way, I am ?rather" aligned with the requirements (4KC
> BANDWIDTH) for the last 3 tubes:
>
> V506: 46 effettive mV (already doubled), it should be 50..70mV
> V505: 23 effettive mV (already doubled), it should be 22..32mV
> V504: 32 effettive mV (already doubled), it should be 25..40mV
>
> But to achieve that, I had to reduce to minimum the gain of V505,
> acting on R532 (the potentiometer in series with V505 cathode).
>
> Also the first two tubes V501 and V502 have a right gain. The problem
> is V503. I am rather sure that every component is OK but, if I want to
> keep on the table, I had to add a 3K3 resistor in parallel with the
> 6K8 to have the about 1 correct gain factor.
>
> To be short: V503 stage is gaining too little, V505 is gaining too
> much and I am not able to explain why. Most the passive components are
> new. The tubes are 110% in the tube tester and also swapping them the
> results are not so much different.
>
> There is furthermore a mistake, I believe, in the manual: in par. 115,
> letter (i), they say to adjust R532 so that you have -2.5V with 300uV
> on J510. That is not compatible with the stage gain chart, that
> requires 130?180uV instead of 300.

>
> By the way, I can state that the overall sensitivity is not very much
> affected by the IF gain: getting more gain does not imply a better S/N
> and so no better sensitivity. That is true particularly for R532.
>
> So, you could ask: if anyway the IF chain has the right gain and the
> gain it is not very important, why are you losing your time on that?
> That?s the more difficult question?. :)

Date: Sat, 8 Jan 2022 15:20:52 -0500
From: David Olean <k1whs@metrocast.net>
Subject: Re: [R-390] Fwd: R-392, IF stage gain

I do enjoy playing with the R-392 receivers and have brought four of them back from the dead. That being said, I always have taken the alignment instructions with a grain of salt. I usually skip trying to couple in with a small coupling capacitor if I can avoid it. What I can do is to try to duplicate the coupling method used by Mr. Becattini and record my results. The IF tubes running on 28 volts can show some variability and bear no resemblance to what a tube tester might say. The best way to test them is in a unit and monitor relative stage gain as you change tubes.? I sorted all my tubes and color coded them with dabs of paint.? Now all I have to do is not lose my color code!!

The important thing to do is have the IF gain peak right at 455 kHz. An accurate 455 kHz signal is important.? Do not rely on a dial setting. I do the same thing with the PTO. I take it out of the receiver and install it in a test fixture with an accurate dial so I can check the end points and the linearity using a good frequency counter. After that, I have never worried much about stage gain and concentrated on whether each stage seemed to be working properly.? The IF stages all have silver mica capacitors resonating the IF windings and I find that these can cause trouble in the following way. At low signal levels, all looks good, but, when you increase the RF signal level, strange things start to happen. You will hear a crackling noise and your AGC voltage will not increase properly as the levels are increased.? You might also find that your AGC voltage will drop over time with a constant rf signal applied, as components get warm. I spent a number of hours removing Vitamin Q capacitors in the AGC circuits? and testing them to find that they are perfect after all the many years since they were manufactured.?? I did find that a few silver mica postage stamp capacitors inside the IF cans would start to leak or actually arc over at very low RF voltages. I have two capacitor checkers, a Military ZM30 bridge (which is very cool) along with a General Radio 1657 RLC bridge. They both give similar and very accurate readings, but the crackling does not show up when testing the capacitors as there is no significant RF voltage across the

capacitors during the tests!!.

My solution is to use a regulated adjustable HV supply and connect the positive lead to one side of the capacitor, and then read the DC voltage with a very high impedance voltmeter on the other lead of the capacitor. I use a Fluke DVM and reference it all to the negative lead on the power supply. Raise the voltage slowly and you can watch for leakage on the voltmeter. I found that some of the capacitors were fine up to about 8 to 12 volts! Above that, and they started arcing and making the crackling sound. A new capacitor fixes everything.? This method of supplying a high DC voltage across the cap is an accurate and effective way to test for leakage. It will expose problems not seen with RLC bridges even if they can measure dissipation.? There are SM capacitors in the RF coils as well, and, if you pay attention to which bands seem to have the noise, you can localize it to a particular set of coils used for those bands. A high frequency scope will allow you to find the right stage. It can be difficult especially in that chain of IF stages in the R-392, to determine where the noise is coming from.? A bad cap in the plate circuit will also show a little noise back into the grid stage of the same tube, so always keep that in mind.

Once I had all my IF and RF stages working properly, I never bothered with checking the stage gains. I figure that, if the receiver will not meet its' performance levels, then I would check into it further.? These radios have no problem meeting their spec, and you can run into a point of diminishing returns very fast.? If you note that a stage does not tune up properly, than that is cause for worry.

I will play around with a nicely working R-392 and get back to you all with what I find as compared to paragraph 104.

Date: Sun, 9 Jan 2022 10:25:01 +0100
From: GIOVANNI BECATTINI <giovanni.becattini@icloud.com>
Subject: Re: [R-390] R-392, IF stage gain

Thank you for having given a so detailed reply, you are very kind.

I shortened still long my message to be not too much tedious, but I lost really a lot of time on this point, especially to fix the AGC voltage drop problem, that, at the end of the day (=many weeks ?), resulted to be not a problem. According my tests, the AGC voltage drops because the IF amplification drops with the temperature, but that has no effects on the sensitivity, i.e. on the S/N ratio.

I also went thru the analysis of the capacitors inside the IF transformers. I don?t know the ZM-30 but have a ZM-11/B, that, I suppose, is the father of

ZM-30. It allows to perform the test you explained me, applying a voltage up to 500V and going down to measure the effective resistance of the device under test. ALL my IF capacitors were rather bad, with an insulation resistance from 300 to 700 k ohm. I GOT IT! I thought and replaced all of them (almost 80??). But not, I could not notice any change in the practical behavior. So I concentrated on a single IF stage (V506) and changed every passive component. To be surer that the temperature had no effect on the resistors, I carried them out of the deck. So, the only component that remained original was the T601 coil (T601 has no secondary winding, the signal is taken out by mean of a capacitor. The one that seems to be the secondary, is only a RF impedance). And fully removed the rectifier V603. I also checked the tubes direct
ly in circuit and I also separated them in classes.

The problem is absolutely the same: when I apply the heat to T601, the V506 gain goes down?. (It can be seen as well on the oscilloscope) But, I as I could check, this phenomenon does not seem to affect significantly the receiver sensitivity, as you can easily check by adjusting the gain of V505 by mean of the potentiometer R532, that allows a wide range of amplification change but that is not very effective on the sensitivity of the receiver. So I archived this problem and (almost) forgot it.

Coming back to V503, my opinion is that the manual is not so perfect as I could imagine and the stage gain is only indicative. In my case, V503, as you said, seems to work correctly. The voltages are OK and nothing suggests that something is not operating properly, or at least that is the conclusion of a tube-beginner like me? Furthermore I noticed that also at Collins they could have had some doubts, because in the later models they added a second potentiometer on the cathode of V504, that, according my opinion, was added to compensate for the low gain of V503.

However, we mad guys don?t like to give up and I have furthermore the temptation to buy some new 26A6 and continue to investigate??

Thanks again, yours Gianni

Date: Thu, 27 Oct 2022 18:42:54 +0000 (UTC)
From: Thomas Hoyer <thoyer1@verizon.net>
Subject: [R-390] R392 Painting

Came across a couple R392s. Front panels are in sad shape but I can glass bead and repaint. I had "heard" that the white paint in the knobs and possibly the lettering is the same radioactive type used on the meters? True? If so I may need to reconsider my approach to refinishing the panel and knobs.

Date: Thu, 27 Oct 2022 14:37:10 -0500

From: Dave Merrill <r390a.urr@gmail.com>
Subject: Re: [R-390] R392 Painting

That's why you see many R-392s without knobs.

Date: Thu, 27 Oct 2022 19:35:09 -0400
From: "thoyer" <thoyer1@verizon.net>
Subject: Re: [R-390] R392 Painting

I have a set of plastic knobs that look new(ish), would they have the same issue? I've only seen four 392's in person and they all have the original knobs - two of which I brought home with me. Here I was looking forward to bead blasting and repainting them.....

Date: Thu, 27 Oct 2022 23:38:19 +0000
From: Les Locklear <leslocklear@hotmail.com>
Subject: Re: [R-390] R392 Painting

I believe Fair Radio had those as replacements at one time. Don’t quote me on that as my memory on R-392’s is hazy at best.

Date: Thu, 27 Oct 2022 18:56:32 -0500
From: Dave Merrill <r390a.urr@gmail.com>
Subject: Re: [R-390] R392 Painting

There is a fellow who has been reconditioning R-392s and selling them at Chicago area fests. He's using 3-D printed knobs and they look pretty good. Sorry I don't have his name or other info.

Date: Thu, 27 Oct 2022 19:27:18 -0500
From: Robert Nickels <ranickels@gmail.com>
Subject: Re: [R-390] R392 Painting

Dave, I didn't know about the knobs, that's pretty slick, but I'm pretty sure the seller is Bob N1KW. He does a solid state audio mod also and the R-392s he's demoed sound great.

Date: Thu, 27 Oct 2022 20:12:59 -0500
From: Dave Merrill <r390a.urr@gmail.com>
Subject: Re: [R-390] R392 Painting

I happened by as he was demoing a stock configuration vs his audio mod and as you say, the difference was remarkable.
