

Friday, 10 November, 2000

**FOR ALL INFO.....** [http://www1.shore.net/~dmoisan/faqs/superradio/gesr\\_faq.html](http://www1.shore.net/~dmoisan/faqs/superradio/gesr_faq.html)

# GE Superadio FAQ Appendix A: Repairs and Modifications

## Superadio II Mods

### Disassembling the Superadio II

[Summarized from comments by Bruce Bacon, Ralph Brandi, R. Hardin, and Gregory Doerschler]

Remove ALL knobs in front, including the tuning knob, by pulling them straight off. A plastic fork is a good tool to use and won't bend the shaft. Be patient but firm--the knobs may be glued or taped on.

Remove the back screws, except the antenna screw. Don't forget the screw in the battery compartment.

Remove the front cover by pulling it from the rear and *upwards* so that it clears the power switch. The power switch is fragile, and a real bear to fix if you break it, so be VERY careful here. You may want to try removing the button from the switch **carefully**--or else pushing it in so it'll clear the case.

If you do break the switch, here are R. Hardin's instructions for repair:

"The power switch is very entertaining to reconstruct, especially if you don't have all the pieces. Unscrew it, take off terminal plate if it's still on (mine wasn't), find little metal slider thingy that grips the terminals on the inside - it slides between terminals 1 and 2, or 2 and 3. There might be two of them, I only found one; shake the radio over some surface where you can find it when it falls out. Put it on terminals 1 and 2 (the off position).

The mechanical parts can be removed now for experimentation:

The button, switch case, and a plate with a funny wire in it that's supposed to be in the back of the switch. There's, what, 8 ways to try assembling it. Well, 4 ways if you consider that POWER ON OFF has to be legible from the front of the radio, and only 1 way if the plate is still in the case. Put in plate with wire, put in button, and see if the button then has two positions it's happy in, on and off.

(If you have a plate and a wire, instead of a plate with a wire, there are more ways to try I guess.)

Leave the switch in the off position, which is the only one it's really stable in without the terminals on, and put the terminal plate on, the slider fitting into the slot in the button. You may have to spread the fingers that were supposed to keep the switch case together a bit.

See how nice the switch works now? Screw it back in, and swing case back on, putting it on the top first and swinging it closed. There's a little forcing past the tuning shaft. Stress the tuning shaft, not the power button!

### Fixing the Dial Calibration on the SR II

by Bruce Bacon:

I've had my SR II for a couple of years now, primarily tuning on the MW side of the dial. The SR II is a great MW DX machine except for one main drawback--dial resolution. Last weekend, I made a modification which has made the resolution much more livable. If you're into taking radios apart, give the following a try:

CAVEAT: If you haven't had an SR II apart before, be very careful with the power switch. Take careful note of what it looks like before removing it! I gave up and installed an NCR receipt printer rocker switch (P/N 006-1050121). Much better, but a bit of a hack.

Remove the knobs from the front of the chassis (volume, bass, treble, tuning).

Remove the 6 screws from the back of the chassis. Remove the screw from the battery compartment. Rock the handle and the chassis should split open (watch out for the power sw). The speaker wires connect both sides of the chassis, so be careful.

The pointer is a piece of plexiglass with an orange colored stripe in the middle. You won't be using the orange stripe anymore for frequency identification, you'll use the left side of the plexiglass!

Find yourself a suitable scribe (I used an exacto knife). The receiver should still operate (careful with the power switch) even though it's opened up. I used batteries to reduce the chance of electrocution.

Turn the dial shaft and start identifying stations. Using the scribe and the left side of the plexiglass, make a vertical mark every 50Khz (550Khz, 600Khz, 650Khz, etc). Be careful to tune the *center* of each station! I made a double vertical line for each 100Khz marker (600Khz, 700Khz, etc..) I guess you could get fancy and make a mark every 10Khz, but I think the dial face would get too crowded.

When you've finished with your scribe marks, you can button it back up. I've found by using the scribe marks in conjunction with the left side of the plexiglass, parallax is virtually eliminated. Frequency identification is much easier. The main thing is to take your time and make sure the frequency you think you are on *is* the frequency you are on!

## **Improved FM Filter Modification, SR II**

by Ralph Brandi:

I've found it a worthwhile modification to the Superadio II to replace the stock ceramic bandwidth filter (230 kHz? 280?) with a narrow filter 150 kHz wide. It doesn't improve sensitivity, but it does wonders for selectivity. For instance, with the 150 in, I can now receive WXPB-FM in Philadelphia, 88.5, (not *well*, but well enough) right next to local powerhouse WBGO-FM in Newark on 88.3.

I got my filter from a friend, along with some articles in the hobby press from a couple of years ago. The source I have listed for 150 kHz ceramic filters operating at an IF of 10.7 MHz is:

*Hosfelt Electronics, Inc.*

*2700 Sunset Blvd.*

*Steubenville, OH 43952*

*(800) 524-6464*

*Part # 27-109, \$1*

I understand there's a minimum purchase, but I don't know what it is, since I didn't get mine there. I'm lucky if I grab the correct end of the soldering pencil, but I installed mine this past weekend. I installed a Radio Shack IC socket in place of the old filter (8-pin wire

wrap, cut in half and with one pin removed, then cut off the excess wire), then plugged the new filter into the socket.

The filter is a little tough to get to; it's on the second PC board under the dial. It basically involves disassembling the entire radio, more or less. It's right next to a "square metal box-shaped thing" as my friend with the filters put it (yes, I'm electrically incompetent).

Things to beware of:

Don't break the power switch. It's a bear to put back together correctly.

Make sure you remove the tuning dial from the outside before you open the radio.

Despite the radio's best efforts to fool you into thinking that it doesn't come loose, it does.

Don't mess with the dial cord. If it comes loose, it's a pain to get back on, if you can figure out how it goes.

Of course, you shouldn't infer from this that any of this happened to me.... :-)

## **SR II Front End Repair**

Michael.B.Hayden@cc.gettysburg.edu (Michael B. Hayden) writes:

My SR II was zapped big time by a proximity lightning strike. The AM section was killed, but FM is OK.

I replaced the first transistor I came to in the front end with the first thing I came across in the junk box, but the SR II is now just a radio rather than a Superadio. It lacks decent sensitivity indicating the replacement transistor is not a good match for what was there. Does anybody have the schematic for the SR II and could tell me the specs for the first couple of transistors in the front end section (just in case the first was not the only one to blow).

Many thanks,

Mike Hayden

hayden@gettysburg.edu

Mike,

I looked at my repair documentation for my SR II (model 7-2885F) and found, or inferred the following information:

AM RF Q5

silicon NPN bipolar transistor, plastic TO92 type case with an ECB pin configuration looking from the non-leaded side and the flat portion of the package under the ECB pin labelling as in ECB. The replacement transistor is listed not as a 2Nxxxx transistor type but as cat. no. EA15X2024, available from GE.

[Parts and service information are given in the Technical Information section of the FAQ.](#)

This transistor feeds directly into the IC chip that does the rest of the signal processing, so if anything else is zapped, it might be the IC. It doesn't sound like this from your description though.

From a practical standpoint, this same transistor is used in the RF amp stage for the FM portion of the receiver, and is biased at ~1ma/3v for the AM section and ~0.6ma/3v for the FM section. These bias points, and use as the FM RF section indicates that the transistor needs to have a good FT, on the order of 200-300MHz at fairly low current, so something like the common 2N2222 transistor would likely give poor results.

The BVCEO break down voltage need not be much higher than 10 volts as there is a simple internal regulator for the collector voltage. The other unknown here is the

capacitance spec of the part for collector-base capacitance. Being in the tuned RF stage, the part might spec a low cb capacitance. I cant tell this from the information that I have. With this information, I would look for a small signal 2N.. number with BVCEO > 12v, and FT specified at low currents, around 1ma. This type of transistor should be readily found in the small signal RF transistor listings for several manufacturers. A transistor fitting this category which should work is the **2N918**. It is a metal TO18 4 lead transistor with one lead connected to the case. This case lead can be left floating, or preferably, cut off.

Hope this information helps you out. Mail me back your experience with this repair when you are done.

Fred

## **Superadio III Repairs and Modifications**

### **Sensitivity Fix for some Superadio III's**

From the March 1993 edition of *DX Ontario*:

"Dave Maunder of Brigus, Newfoundland, has had some interesting experiences with his Superadio. He writes, 'Although an R-5000 is my 'workhorse', I've often used a GE Superadio II for medium-wave listening. When the Superadio III became available last fall, I ordered one from Universal Radio. Anxious to do a side-by-side comparison with the old model II, using only the built-in ferrite rod antenna for the test, I was disappointed to find that my new model III exhibited a high background noise level and much poorer sensitivity.

So I disassembled the Superadio III to do a little 'tweaking', and was surprised to find that performance instantly improved when the 2 halves of the cabinet were separated by the length of the speaker connecting wires. The noise level dropped drastically, and the sensitivity came way up. I now could easily hear VOUS, a 50-watt U.S. Armed Forces station in Argentina, Nfld, on 1480 kHz, and St. Pierre-Miquelon on 1375 was easy. (This at 1:00 p.m. local time at my home about 40 miles from St. John's.)

But when I reassembled the radio, performance deteriorated to the original level. There seemed to be some kind of interaction between the speakers in one half of the case and the circuitry in the other half. I suspected that it was the strong magnetic field saturating the antenna rod's ferrite core, so I wrote GE asking if they had a fix.

They seem aware of the problem, and suggested simply reversing the two leads from the circuit board to the speaker unit. I was skeptical, but I tried it and their cure worked perfectly. Not only is the GE Superadio III a hot MW-band receiver, (British, German and many other European MW stations are audible nightly here on the edge of the North Atlantic, especially when using my 100- foot long wire) but, on strong signals, the audio in the "wide" position is exceptional...indeed, very close to FM quality in range and clarity.

Perhaps this tip might be useful to someone else who buys a GE Superadio III. Not all units may be affected, but if the noise floor seems high and sensitivity poor, try reversing the speaker leads!"

### **SR III Power Switch Fix and Dial Light**

Bill Bonner:

I read the FAQ about the Superadio and decided to buy one. I bought the Superadio III. Of course, I broke the POWER switch taking the radio apart. After I saw it was hopeless to fix the switch, I went down to Radio Shack and bought one of their small slide switches

which fitted in the hole left by the broken switch and could be held in place with the same screw. The part number for the switch is 275-409.

The disadvantage of this is that you have to reach your finger into the hole left by the POWER switch to turn the radio on and off. The advantage is that the radio does not inadvertently get turned on in baggage, etc.

The Superadio III is held together by 7 screws in the back, six visible and 1 in the battery compartment. The tuning knob on the side and the volume and 2 tone control knobs on the front pull off. The 3 slide switches on the front do not need to be removed. The POWER push button also comes off; it is held on only by friction helped by a little piece of tape (no kidding). I did not learn this until after I broke the switch. The front and back separate with everything but the speaker going with the back.

I also bought a small 3" ball bearing rotator for lazy-susans at a hardware store and screwed it to the bottom of the radio so it rotates with a feather; great for nulling AM stations. I put stickem felt pads on the bottom of the rotator so it wouldn't mar furniture. One surprise was that the rotator worked well for FM. By extending the FM rod horizontally and rotating the radio, I could pick up two stations on several of the frequencies I tried; Baltimore vs W.Va for example from here near Washington DC.

I also found the lack of calibration annoying on AM. I measured the distance in mm for the pointer every 50 kHz (helped by a digital radio I admit) and drew the lines on white paper with a number below every 100 kHz. (I actually used DrawPerfect which will transfer measurements without distortion, but a fine tipped felt tip will do fine.) I cut out the strip of paper and taped it to the black plastic "runway" behind the pointer. It works well during the day; the lines and numbers show up fine through the AM and FM windows.

I also found it annoying that the radio had no light to use in the dark. I am used to a Sony SW7600 which has a light which goes on for 5 sec when you press the button. I wired a tiny 12v lamp from Radio Shack through one of their tiniest momentary push switches. The part number for the lamp is 272-1141 and 275-1571 for the push button switch. I placed the lamp with tape on top of the runway; there is just enough space for it to fit when you put the cabinet together. I drilled out one of the two guide holes for the POWER button used to use and placed the switch in it. I ran wires from the battery pack contacts (9v) for power. The light switch is next to the new slide power switch. The lamp though dim gives enough light on the white paper to easily see the dial placement at night. I may wire two 6v lamps in series to cover the dial scale better.

As you can see, this radio has brought out the tinkerer in me. I hope some of these ideas are useful to other Superadio fans. I can often pick up WOR 710 kHz, WFAN 660 kHz, and WCBS 880 kHz during the day at listenable levels.

Bill Bonner

### **Comments on SR III Alignment**

Paul Nix:

Has anyone else found the dial calibration on the GE Super Radio III unacceptable?

Electronic Equipment Bank ('EEB') has sent me two radios now, and the 2nd is worse than the first.

The folks at EEB have been very 'open' about the problem, with one of their technical guys telling me last Friday (Jan 6th, 1995) that I wasn't the only customer fussing ... and that they (EEB) had checked 10 new receivers ... and ALL of them had some degree of noticable dial

inaccuracy.

I'm not talking about a little inaccuracy ... but rather the kind that might keep you from finding a station unless it was really strong.

Here in the Dallas area, WBAP is on 820 kHz, and on the 2nd GE SR III, that shows-up EXACTLY half-way between the "7" and the "8", which (except for the expectable scale compression) would indicate around 740 - 750 kHz.

I've run checks all across both the AM and the FM bands (using my Sony ICF 2010; which I've adjusted its synthesizer crystal so that all the WWV freqs 'track' VERY well), with the following results:

#### AM

Is off only slightly at the high-frequency end (found a good, strong, Spanish language station right on 1600 kHz), with the error steadily increasing as you go down in frequency. The only problem (in thinking about a 'fix') is that, right at the 'bottom end' (using a station on 540 kHz as the test), it look like the calibration suddenly is OK ... so that there's not a continual, uniform, trend that would seem to offer the chance of a slight 'tweak' of what used to be called the "bandspread adjustment" (I have the flimsy schematic, and so can see what adjustments are available).

#### FM

Here the error (on the receiver tested) is almost perfectly uniform across the band, leading me to believe that the calibration could be brought into pretty close alignment without too much effort.

#### Technical comments

GE (if you want to call it that ... it's made in China) uses varactor diodes to do all the tuning. That makes me VERY suspicious about the capacitance/voltage linearity.

There's what appears to be an oscillator (running in the 3 - 3.5 MHz range) that's used as a voltage inverter/multiplier (I haven't puzzled that out completely). That voltage runs through a resistive network ... with a potentiometer sitting 'between' two pots wired as rheostats. It is through that resistive network that the tuning voltage is developed, with the receiver tuning (I believe this to be true, although the 'service instructions' don't say this, and I haven't opened-up the receiver to check, since it may get sent back) being varied by that potentiometer. The 'service instructions' are VERY sketchy, providing NO data as to what the desired DC voltage range is supposed to be across the tuning diodes.

You can see (viewing the schematic) that by tweaking the pots, the tuning range could be radically changed, but what's needed is some information concerning what the design spec's called-for, in terms of 'tracking'.

Even though varactor diodes perform the function, the 'mechanics' of getting the oscillator to track the RF tuning in a superhetrodyne receiver still hold true. The 'service instructions' provide essentially NO information on how to set up the range of the tuning voltage.

Paul Nix, WB5AGF

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Christopher King:

I really wanted to be a whiz and post the alignment instructions here, but to be honest with you, it's been several months since I've had my SRIII open, and I can't remember all of the details now. I will go back for a second look and provide more detail, but for the time being, suffice to say that this radio pretty much aligns like any other traditional superheterodyne design.

**Essentially, you have two adjustments for the local oscillator, a coil for the low**

**end of the dial, and a trimmer capacitor for the high end. These two adjustments interact with one another. You'd want to make sure that the pots you mentioned are somewhat correctly adjusted, to get the dial at least somewhat in the ballpark. After this, it's a matter of:**

- **tuning to a station around 600KHz (or set signal generator for 600KHz)**
- **adjusting the coil for best accuracy**
- **tuning to a station around 1400KHz (or set signal generator for 1400KHz)**
- **adjusting the capacitor for best accuracy**

...and repeating these steps until no further improvement is obtained. What will happen is that you'll pull the marker in one direction, then the next, as well as lengthing or shortening the distance between 600 and 1400.

**You also have to RF adjustments on the radio; again, an inductor for the low end and a capacitor for the high end.**

**Alignment of these is pretty much like the oscillator adjustments** -- back and forth until no further improvement is obtained. Funny thing about **the oscillator coil**, though: not only does it position the dial pointer and varactor tuning, but it also **raises and lowers the signal strength**. So you have to be careful to **not only tune this for dial accuracy, but also for maximum signal**. Suggestion here would be to tune the coil for strongest AM reception, then get the dial position as close as possible using the two potentiometer adjustments you mentioned, before starting the back-and-forth procedure I previously mentioned.

But before you start to mess with these, you should make sure that the 455KHz IF is correctly adjusted... if I remember right, there's about three or four transformers to tweak here. You'd want to set your signal generator for this frequency and pick a point just before the first IF stage to feed it into the radio (you can find this with the schematic). Hook your VTVM to the speaker leads and adjust for maximum audio signal (be sure that your 455KHz signal is modulated, usually with a 400Hz tone). You'll find that one of the IF transformers will adjust frequency (I think the one closest to the radio's mixer stage), and the rest only affect signal strength. Again, you'll be going back to re-adjust and re-re-adjust until no further improvement is obtained.

I was able to get my dial extremely accurate, but it was quite a bit of work, as you might have gathered from this note. Mine, for the most part, tracks perfectly. What I have NOT corrected, however, is the problem of the **two "birdies"** my SRIII has, **one at 790KHz and a weaker one at 1240KHz**. I have not yet been able to figure out where the false signals are coming from.

I've gotten as far as determining that one of the FM adjustments in the front end moves the birdies around, but I have not been able as of yet to remove them completely. I'm just sort of living with it for the time being, until I get in a masochistic enough mood to pull the cover off again...

If you have or get the SRIII service manual, the AM alignment instructions are there, and they work well if followed...

If someone out there knows how to get rid of the "birdies", please make my day and email... :) Perhaps someone at GE ought to spring for some basic electronics/radio training for the Chinese political prisoners they have building these radios, so consumers like us wouldn't have to grapple with stuff like this...

C.K.

January 9, 1995

### **SR III Dial Alignment**

From Bob, N1KPR:

Dial miscalibration: Forget about it when you first get the radio.

Go directly inside, observing all the precautions as described elsewhere, and adjust the two pots, both wired as rheostats, **for dial linearity. They are R1 and R3.** Best to use a signal generator rather than station markers since this is a tedious, but rewarding, process. You must first know how far off the dial cursor is; not in KHz but in inches (mine was off one-half inch). Then go about the business of **making the entire dial linear. I started at the low end and adjusted R3 (one leg of R3 goes to ground), then proceeded to R1 ((third leg goes nowhere). Back and forth several times checking linearity at .5, .7, 1.0, 1.2, & 1.5 MHz.** Once this is done go have a coffee.

After relaxing for a minute take an eyedropper or better yet a syringe with a few drops of mineral spirits in it and carefully soak the adhesive which holds the dial string to the cursor. Don't put too much so that it drips down to the face plate. When the glue softens, set the signal generator to 1 MHz or a known station at center dial and carefully slide the cursor into its new and correct position. I did it by holding the string and carefully wiggling the cursor to free it of its sticky binding to the string. Don't force anything - apply a second or third application of mineral spirits as required. Once in position, check calibration at both ends of the spectrum. Then apply some contact cement or other rubber based adhesive. Use just a little as there is really no stress on this free sliding part.

**On one occasion, loosening the cursor was not necessary since the two pot adjustments did the trick.**

### **Always try it that way first.**

Alignment of the tuned circuits and IF coils is always off. That is to say, they are not "peaked" as received from the factory. You should have the manual for this, only because it provides a schematic of somewhat utilitarian value. However, neither the manual nor the PC board define parts placement--you'll have to figure that out yourself. **Peak everything for the best signal - noise ratio. That would be T4, T5, T6, T9, T10, L5, L6, C8, C30, C37** and you are done. One confusing point L6 is the ferrite loop antenna for AM and it has no adjustments. I can only assume that they mean by adjust it is that they want it broadside to the source of the signal if you are not using a direct hookup with the sig. gen. The manual, SM72887A cost me \$9.80 plus shipping and is 5 pages long. That is more than \$2.00 per page!!!

On the bright side, it is money worth spent if you want the absolute best from your SR III. The peace of mind makes it all worth while. In A/B testing I find the SR III to be better than any of the many portables which have been in my shop, better than almost all table top radios and better than about half of the communications and Ham receivers by a small margin. The other half it is equal to or slightly worse than the big rigs (AM B'cast, only). Here in Southern CT I can receive an intelligible signal at just about every 10KHz position. . . and the little thing does sound pretty good for a small box.



Happy listening,

Bob, N1KPR

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### **Food For Thought: SR AM/FM Spectrum Analyzer?**

David Woo:

Also, since the receiver is tuned via varactor diodes fed from a variable DC voltage from the tuning potentiometer, one person said they were going to work on a spectrum analyzer conversion. This would have been similar to what showed up in "73" magazine some years back, where they used a SONY (SW-20?) receiver modified to use varactor diodes for tuning, which was then swept with a ramp generator.

So, in the Superadio III case, you would take sweep from an oscilloscope, feed that to the tuning diodes, and feed the audio output into the Y-axis of the scope... has anyone attempted this? Might make an interesting AM-DX (FM-DX?) band monitor...

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[\[Wakko's Radio Page\]](#)

[\[Dave Moisan's Home Page\]](#)

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