

The Slab Bacon's "Receiver Road Test"

by Frank - KB3AHE

Introduction

I am writing this article due to the increased interest by fellow AMers toward some of the older vintage receivers. I will not waste our time in discussion of the less desirable low end units, but will tailor this discussion to the more desirable higher end units that can be considered useable by today's standards. In my opinion S-38's and NC-57's are not worth wasting the time to discuss, since they are not useable under today's crowded band conditions. My evaluations will be primarily based on the receiver's performance for AM operation, but I will make references to it's performance on SSB where necessary. All of the receivers that I will be discussing in this article are receivers that I own or have owned in recent times, or have spent enough time in front of to formulate an opinion.

One must keep in mind that receivers are much like people, in that each one has its own distinct personality. When operating your own or someone else's station, the first thing you will notice is the personality of the station receiver. You really don't pay much attention to the transmitter as long as it is working properly. If the transmitter doesn't zorch, snap crackle, pop or do any other odd things, you don't really pay much attention to it as long as it comes up and plays. HOWEVER, you always take notice of the receiver's personality. You are always fiddling with the tuning, bandwidth, volume, and other controls to better copy the station that you are working, especially if they are a piss weaker. You almost always notice the selectivity, bandwidth, and audio quality of the receiver.

One must keep in mind that there are basically two types of receivers: "Battle Conditions" and "Hi-Fi" receivers. And usually a receiver is always one or the other. Battle conditions receivers usually have too narrow IF bandwidths to produce good audio, and Hi-Fi receivers are usually too broad for poor operating conditions. Also keep in mind that a lot of high end communications receivers don't even have an audio section capable of producing good audio, even if the front end would pass it.

Sometimes a few simple modifications can allow you to have your proverbial cake and eat it too. A few simple mods can give you some of the best of both

worlds in a particular unit. I will make some brief references to mods that I have found to be useful, But I wont go into detail, as that is not the purpose of this article.

This article is not meant to contradict Johnny Novices (W3JN) article <<http://www.amwindow.org/tech/htm/jnreceiverguide.htm>>, but to supplement it with more information, as he is a good friend, and someone that I consider as

knowledgeable as myself (if not, more knowledgeable). This article is also meant to offer my opinions to the mix, and possibly help a new boatanchor enthusiast decide what may tickle his fancy in his next receiver choice. After all, opinions are like a certain part of the anatomy; everybody has one!

One last thing before going on. Try to get the manual for your receiver of choice. Some receivers have certain “hidden” features that you may not find out about without the manual and never find by just jumping in and “flying blind.”

Benchmarks, Likes and Dislikes

I have been an avid SWL since I was young child. I had many crappy, low-end receivers over the years and all of them left you feeling like you were missing something. About 20 years ago I fell into my first R-390A and it was love at first bite!!!! I have had nine of them since. Although it's audio section is somewhat lacking, it was, is, and will always be the benchmark standard by which I will judge all other radios that I have and will ever own. I was totally set in awe (back then) by the front end performance and adjustable bandwidth of this radio. For many years I felt that there wasn't anything else out there that was even worth owning. However, some years ago I decided to take a serious look at some of the other nicer more desirable receivers that were out there, and was very pleasantly surprised. Here are my likes and dislikes as far as specs and features go (not necessarily in the order listed.)

Likes:

- 1 Good dial tracking.
- 2 Calibrated bandspread dial that is usable.
- 3 Adjustable IF bandwidth with sharp skirts.
- 4 Bandwidth selections that fit AM operation.
- 5 Good audio, with the power to drive a good sized speaker.
- 6 Good sensitivity, and sensitivity on the higher bands.
- 7 A good working crystal calibrator, preferably 100 kc.
- 8 Noise limiters that are actually useable.
- 9 A strapping BFO and the ability to receive SSB if necessary.
- 10 Good AGC action, and the ability to switch the AGC in and out.
- 11 Notch filters, Q-multipliers and other selectivity aids THAT WORK.

Dislikes:

- 1 "Barn door" broad front end performance.
- 2 Lack of frequency stability and large amounts of "drift".
- 3 Crappy crystal filters that don't work very well.
- 4 Uncalibrated bandspread dials and not knowing quite exactly "where you are".
- 5 HRO type dials and frequency conversion charts.
- 6 Wimpy, worthless BFO's.
- 7 Birdies, images, and other spurious signals.
- 8 Poorly designed AGC circuits, and not having the ability to switch out the AGC.
- 9 Lack of sensitivity on the higher bands.
- 10 Plug-in coils and coil sets, as these have a tendency to get lost and leave you looking for the set that you need.

“Road Tests”

Please keep in mind that all of my receivers have been totally recapped, and aligned as close to factory specs as I am able to do. I am not “brand loyal” (Ford vs Chevy) to any brand in particular, so I can be as objective as possible, with no bias.

As I said earlier these, “road tests” are based on receivers that I own, have owned, or have spent enough time in front of to develop an opinion.

Collins 75-A3

This receiver has the classic “St. James gray” look that Collins was so famous for. Some like this styling and some don’t. (I think they’re ugly.) This receiver is also classic in Collins’ design and sought after by the infamous Collins collectors. Collins spent all of their money in the front end and about 10 cents on the audio section. I still don’t feel that they are worth the money that they are bringing these days, but they are a good solid performer.

The frequency stability is very good due to the Collins PTO and the second conversion being crystal controlled. The dial tracking is very accurate and precise. The sensitivity is very good, all the way through 10 meters. This receiver uses the famous Collins mechanical IF filters, and the receiver’s selectivity is strictly dependent on which choice of filters (2) you chose to install in it. The BFO’s performance is adequate, as is its performance on SSB, but it could use a product detector. (the A-4 has one)

The audio section is miserable and low-fi at best, and is in serious need of modification. There have been many audio mods published for these receivers. However with the right choices in filters, together with some good audio mods, this receiver is very capable of giving “your cake and eating it too” performance. But definitely not in stock form.

Collins Design R-390-A

As I have said before I have had nine of these guys over the years and a good working one is the benchmark by which I judge all other receivers. Although designed and first produced by Collins, these radios have been manufactured under contract buy just about everyone in the electronics industry, and even rumored to having been made by one cosmetics manufacturer.

The looks of this receiver with its many knobs and its mechanical digital dial is a look that you either like or don’t like, but it has a style all of its own. These radios are truly “high performance” receivers. They have the best front end performance of any receiver I have ever used. They have a nice selection of mechanical filters built-in, giving IF bandwidths that really work. They do everything else fairly well in stock form and I have even used mine for RTTY and other digital modes. Its sensitivity and selectivity are most excellent and the sensitivity doesn’t

drop off even up to the top of its range at 32 MHz. The two things that I don't like about these radios are the lack of audio output (less than 1/2 Watt), and the fact that you will get a bad case of carpal tunnel syndrome if you like to tune around a lot. There have been oodles of mods published for this radio and a few well done ones can give you the best of all worlds!

The biggest thing that it needs is a souping up of the audio output. I change the output tube to a 6AQ5 (you have to rewire the socket) and change the output transformer to any good 5 Watt single-ended transformer with an 8 Ohm secondary. Also fatten up the coupling caps while you're in there and you will have plenty of audio. Some also pipe the audio out of the "diode load" terminals to an external amplifier. It's your choice. I also like to fatten up the BFO injection coupling cap. This will dramatically help the performance on SSB without a product detector. My last one is a keeper, and I'll hang on to it until they pry it from my cold, dead hands!! It is a true radio mans radio!

Geloso G4/214

This is a very unique receiver and a real pleasure to own, especially from a collectors point of view. They seem to be somewhat rare, and are somewhat unusual in their European styling. John Geloso was known for his high quality equipment, and this Italian import from the early 60's is no exception. The European techno styling and the large fan dial are really appealing to one's like of things hammy. It doesn't do any one thing especially well, but it does do everything very acceptably. It is as comfortable on SSB as it is on AM.

The selectivity is reasonably good and this radio has one of the best working crystal filters of any radio that I have ever used. It is crystal controlled dual conversion and has good stability. It makes reasonably good audio "right out of the box", and it is good natured and user friendly.

If you take this guy out of the cabinet and look at the underside you will see the absolutely neatest wiring that I have ever seen in a factory produced piece of equipment! The wiring is much neater than any American produced radio that I have ever seen. The underside of the chassis is like the centerfold in a good girlie magazine, you just want to keep looking at it, and don't want to close it up!

One thing that is a bit weird with this radio is the crystal calibrator. It is at 3500 kc instead of the usual 100 kc, so you can only cal the bottom of each band. This radio is a real pleasure to own and a nice addition to anyone's collection, and it works just about as good as it looks.

Hallicrafters SX-17

If you like the older "silver dial" receivers this one is a real pleasure to own! It has good sensitivity and good selectivity. The two-position IF bandwidth switch actually works, and is just about what you would want for good AM operating. The narrow position is somewhere

around 4-5 kc and the wide is somewhere around 10-12 kc depending on how good your alignment is. The crystal filter is actually useable and worked fairly well in mine. This receiver has a strapping BFO with adjustable injection and the BFO is so strong that mine would swamp out the detector if turned wide open. It receives SSB very well with no mods, very cool for a receiver that was produced on the 1930's.

But the best thing about the SX-17 is it's audio!! With push-pull 6V6's it makes absolutely fabulous audio, and plenty of it. It easily drives a 12-inch, 3-way speaker system and fills the whole room up with audio.

My only dislike about this radio is its lack of calibrated bandspread (it has plenty of bandspread dial) and small markings on the main tuning dial take some getting used to and always leaves you wondering "where you are". If you are lucky enough to find one and like older stuff, it's definitely a keeper.

Hallicrafters SX-42

This one is definitely more a "Hi-Fi" than a "battle conditions" receiver. I love the big round blue-green dial when it's lit up. It looks especially neat in a darkened room. This is basically the "hammier" version of the SX-62, which I will discuss next. The calibrated bandspread works well and the dial tracking of the main tuning runs pretty accurate. It is user friendly and fun to use on a quiet night. This receiver covers from the bottom of the AM broadcast band to the top of the FM broadcast band continuously. And does AM, FM, and CW.

The selectivity is reasonable, if aligned properly, but nothing to get excited about. The sensitivity is quite good for an older single conversion receiver and you can switch out the AVC for those fade filled auroral nights. The BFO is not much and this receiver is basically worthless for SSB. A little playing with the coupling gimmick will help make the BFO a little more useable, but it still isn't much. The feature of note on this receiver is its audio. Push-pull 6V6's with phase inverter coupling and a negative feedback bass boost circuit make for absolutely gorgeous audio.

Hallicrafters SX-62

Although designed for "the discriminating short wave listener" this is also another interesting receiver. If you like big slide rule dials, this one will definitely turn you on! It is basically a reconfigured SX-42, redesigned for the SWL more so than the ham.

The selectivity of my 62 seems to be a little better than the 42, however, the BFO is just about worthless. It has the same frequency coverage as the 42, however it doesn't have a bandspread. The tuning is slow enough, though it doesn't seem to be a problem for use on AM. The selectivity steps seem to be adequate for standard AM use, although it is most definitely not a

“battle conditions” receiver. The large glass slide rule dial, with all of the little dots and city names adds a neat remembrance to some of the old floor console sets from the 30’s. It does not have the AVC cut out switch, or S-meter that the 42 does, but it does have a 100kc crystal calibrator that the 42 doesn’t.

It also has the same audio circuit as the 42 and makes the same fabulous audio as the 42. Several of my friends were so impressed by the audio from my 62 that they went out and bought one. One little sub note: both the 42 and 62 are no fun to recap, but the end result is well worth the effort.

Hallicrafters SX-101A

There are many variants of this receiver and all are a little different. SX-101 had besides just SX-101, a Mark 1, 2, 3, 3A. The SX-101A had no Mark suffixes. It stayed a plain SX-101A throughout its life. All are a little different with circuit and feature differences, some subtle, some major. Mine is a 101A with no marks and that is the one that I am going to discuss.

This receiver is one that deserves considerable mention. With a few simple mods this one could easily be the proverbial “have your cake and eat it too”.

Its RF performance is extremely good. Its performance on SSB is most excellent, it tunes SSB just about as good as a modern transceiver. It has a good stable BFO and a very good product detector. It also uses some of the newer high performance / low noise tubes. It has very good AGC action and is switchable in and out. It has very good selectivity and sensitivity, and a useable, fairly good working notch filter. After a good warm up it has exceptionable stability.

It just does almost everything right. Well, almost! It has terrible audio, but is easily fixed. With a few simple mods, this has become one of my most favorite receivers. With one audio mod courtesy of W3JN (clip out one cap in the ANL circuit), and a few of my own (change the values of 2 caps, swap the output transformer and change the output tube from a 6K6 to a 6V6), it will make very pleasant warm audio that is not quite full Hi-Fi, but very easy on the ears. The 5 kc bandwidth is a little narrow for full Hi-Fi, but a slight detuning of the low IF’s stretches this to around 6 kc in the wide mode and makes very pleasant audio. In stock form mine wouldn’t pass any audio below 300 Hz or so.

Mine does have a few birdies, but they are very weak and in places that never seem to get in the way. This receiver has become my favorite ham band only receiver and is a permanent “keeper”. This is another one that they will have to pry out of my cold dead hands.

Hammarlund HQ-110

Although put down by many, this is a neat little radio. With a few easy mods it produces good audio and makes a really neat compact AM station when paired up with something like a Johnson Ranger! This little receiver is double conversion and is quite sensitive all the way through 10 meters. It covers 6 Meters, but I never used mine there. It may not be the choice for all out “battle conditions”, but it is a good versatile receiver under most normal operation conditions.

The Q-multiplier gives this radio completely variable selectivity and works very well. It has a very good BFO and works well on SSB. It has switchable AGC and must be switched out for the SSB reception or the BFO will swamp out the detector. If you disable the “auto response” circuit (snip one wire) and do the W9MDX negative feedback audio mod <http://www.amwindow.org/tech/htm/hqaudiomods.htm> this little radio produces quite good audio. These receivers usually go fairly cheap at hamfests. If you find one for a reasonable price, don't be afraid to snag it!

Hammarlund HQ-145X

Here is one that is definitely not a “Battle Conditions” receiver. It is dual conversion and has good sensitivity, even on the higher bands, but its selectivity leaves a lot to be desired. The IF bandwidth is a little too wide for today's crowded band conditions. The crystal filter in the one that I have doesn't work very well and the notch filter (which does work fairly well) is not enough to cut it on 75 meters in the evenings. The dial tracking is fairly good, as is its stability. The BFO is adequate, but nothing to get excited about, as you have to back the RF gain way down to copy SSB signals.

Like the 110, if you disable the “auto response” circuit and do the feedback mod <http://www.amwindow.org/tech/htm/hqaudiomods.htm>, it does make pretty good audio. I feel that this receiver, even though it has ham band calibrated bandspreads, is better suited for SWLing than amateur operation.

This is a good-natured, easy to use receiver, but it doesn't do anything especially well. For one of Hammarlund's higher end offerings, I feel that it is a little bit of a disappointment from what you would expect from them.

Hammarlund HQ-150

This one is the last of the Budd cabinet HQ's, and is probably the best of that line. It is basically a HQ-140 with a few improvements and a Q-multiplier. You don't see many of these around and they are a nice catch if you find one. It does everything well, but nothing fantastically. It is an easy going, good-natured receiver with some interesting features.

It has very good sensitivity on the lower bands, but does drop off some on the higher ones. The dial tracking runs fairly well, and it does have a bandspread calibrated for the ham bands. The BFO is adequate and stable. The crystal filter actually somewhat works.

But the neatest thing is the built in Q-multiplier! It gives you nice continuously adjustable selectivity bandwidth or a notch filter selectable at the turn of a switch. The Q-multiplier really adds a nice touch and a lot of usability to this radio. Mine is a pleasure to operate.

My only gripe about this radio is that the “out of the box” audio is a little bassy and somewhat lacking in high end response. However, clipping out one capacitor cured this.

If you like the “older” gear, one of these would make a nice addition to your shack! If you liked the older HQ-129-X and HQ-140, you will love this one.

Hammarlund HQ-170

This is a receiver that has been put down and maligned by most of the AM community due to it's poor audio. However it is probably one of the best “battle conditions” receiver ever made. Due to it's very narrow, squeaky tight IF bandpass (3 kc) it will not and cannot ever make good audio, but it wasn't designed to. A few simple mods will however produce tolerable “communications quality” audio.

These radios are quirky, complicated and no fun to work on, but under the right conditions, a pleasure to use. This is a true “radio mans” receiver and will hear when nothing else will! It has all of the features you would ever want in a radio, except good audio. You can dig a piss-weaker out of the noise with the Scranton Screwball screaming 5 kc away. For an older tube receiver it has many of the features found in modern transceivers.

The selectable sidebands switch is actually an IF shift, and the “vernier tuning” is actually passband tuning. The ability to listen to either sideband of an AM transmission and then pinch down the bandwidth and shift around the passband to boot is a great way get around jammers and intentional qwerms.

The AGC time constant is adjustable from the front panel, and it has a fairly good notch filter. Mine also has a better signal to noise ratio than my R-390A. It also has a fairly good BFO and a product detector, so it does quite well on SSB.

By disabling the “auto response” circuit, adding the feedback mod <http://www.amwindow.org/tech/htm/hqaudiomods.htm>, and stagger tuning the low IFs, it will at least make “communications quality” audio.

This radio is not “user friendly” and takes some “getting used to” and reading of the manual to realize its full potential. This radio has just about every feature that you would ever want in a receiver EXCEPT good audio. However, use it for what it was designed and it makes a great “secret weapon” to have in your arsenal!

Hammarlund SP-210X / BC-1004

The old Super Pro 210 is another possibility for the “have your cake and eat it too” contest winner. For a WWII era radio, this is another truly great receiver, and can handle all but the worst operating conditions. It has good sensitivity, good selectivity, and good audio all in one package.

The continuously variable IF bandwidth gives you the selectivity you need for the operating conditions you are facing. The crystal filter actually works, although you will seldom use it. The BFO is adequate, and the AGC is switchable. It has what it takes to be a really great receiver without any modifications. The frequency stability is quite good and the dial tracking on mine runs very close.

The most outstanding feature of this radio is its audio. Push-pull, triode connected 6F6s driven by a triode connected 6F6, combined with large oversized audio transformers produce some of the best audio that you will hear coming out of an old military receiver!

Recapping these radios is not an easy job, but well worth the effort. With old paper caps inside the IF cans and in some tough places inside the coil catacombs, it is a time consuming job.

This radio does just about everything well and is a nice addition to anyone’s shack. My only dislike for this receiver is its lack of a calibrated bandspread dial. It just has a scale of 1 – 100.

Heathkit HR-10 / 10B

Here is one that doesn’t do much of anything well, and isn’t worth the effort to carry it to the car from the hamfest table. Unless you are a Heathkit collector, or just have to have one to pair up with your DX-60, don’t waste your time with this one. They just don’t do anything very well. They are cute, compact, and just about worthless.

Heathkit MR-1 Comanche

This is an interesting little receiver, although not a great performer. Its sensitivity is reasonable. It has somewhat interesting styling for a little box. The tuning is a little fast, but useable, and it actually has a product detector. The BFO is a bit wimpy, bit useable. The IF bandwidth is fixed at 3kc with a crystal lattice filter. Again, it doesn’t do anything especially well, but it is useable if you have to.

One annoying problem with this radio was a nasty distortion in the audio caused by a poorly designed detector circuit. Rather than reinventing the wheel and redesigning the detector, I just got rid of the radio. It was easier.

Heathkit SB-303

This is the only solid state receiver that I own, and it's a pretty neat receiver. I was lucky enough to stumble onto one with the elusive AM filter installed. At 3.75kc it is way too tight for Hi-Fi AM, but tolerable if you have to. This little receiver does a lot of things well, except make good audio.

It is dual conversion with amplification and crystal lattice filters between the first and second converters also. It is extremely stable, and has very good sensitivity. It was designed as an SSB receiver and does that very well. It has switchable AGC, a good BFO, and excellent dial tracking. A 100 & 25kc calibrator is standard equipment. I haven't found any images in mine, but it does have a few birdies, although the birdies are in places that don't seem to bother you.

One thing that this radio will never do is make good audio. Changing the AM detector bypass cap from 0.01 uF to 0.001 uF, and changing the audio output coupling cap from 100 uF to 470 uF will at least produce fairly decent "communications quality" audio.

Not a great AM receiver by any means, but an interesting standby or back up receiver it is. I often use mine for checking the frequency of received signals.

National NC-183

This is another good natured receiver that is easy to use. It is just a little broad for overcrowded band conditions, but somewhat tolerable under most normal operating conditions. The sensitivity is very good on the lower bands, but drops off noticeably in the higher bands. The BFO is adequate and you are able to copy SSB with it if you back the RF gain down a bit. It has ham band calibrated bandspread, and the bandspread and main tuning dials track very close to true. The crystal filter actually somewhat works, and is useable.

But the real calling card for this radio is it's audio. Push pull 6V6s with phase inverter coupling make very good audio, and lots of it! This is a very nice Hi-Fi / easy listening receiver and well worth considering.

National NC-183-D

If you liked the 183, you'll love the 183-D! I actually bought one to compare it to the 183. It has everything that the 183 has, and more. The dark gray cabinet is much nicer looking than its older

brother, the dials are painted on steel backings instead of celluloid like its predecessors the 173 and 183, and look dramatically nicer.

With dual conversion above 4Mc, the sensitivity on the higher bands is dramatically improved over the 183. The selectivity is noticeably better than the 183, and it just works a little better all the way around. The selectivity is adequate for all but all out full battle conditions. The crystal filter works a little better than the 183. The dial tracking is very good, and it actually hears fairly well all the way up to 6 meters.

It has the same good push-pull audio as the 183. One problem with them is some audio distortion caused by the AGC. This receiver has a separate AGC IF amp. I have heard several mods to eliminate this problem, but found a very simple way out. Be sure that the 6AH6 AGC IF amp tube is good and hot (or new), and its IF can is peaked perfectly. With these conditions in order, you will be rid of 99.9% of the distortion problem.

If you like the classic dual crescent dial styling, this one is a definite keeper!

National NC-300

Touted as National's "dream receiver", it makes a valiant effort to live up to that moniker, but does fall just a little short. This is another good natured radio that is somewhat easy to use, and a nice receiver for the beginner, as well as the seasoned operator.

The sensitivity, and dial tracking are quite good. The selectivity is good enough for all but the worst operating conditions, and it makes pretty good audio right out of the box. With 8kc, 3.5kc, and 1/2kc the IF bandwidth selections are a little lacking in choice. The 8kc position is a little wide for most evenings, the 3.5kc position, (although more like 4kc) is a little narrow, but acceptable for crowded evening conditions, and the 1/2kc position is worthless for anything except CW. The 8kc bandwidth, along with the wide audio bandpass will produce some fairly decent audio when the need arises.

One nice feature is the switchable audio bandpass on the tone control. This bass cut / audio pinch is rather handy when you are trying to pull a piss-weaker out of the noise.

The AGC is not switchable in the AM mode. The self oscillating product detector / BFO is somewhat wimpy and requires a considerable reduction in the RF gain for SSB reception. The crystal filter doesn't work very well, but isn't a real problem as the IFs are pretty tight.

However, despite its faults, this good natured receiver is an excellent choice for the beginning AMer. Mine sees active duty just about daily.

Epilog

I'm sure many of you that read this are probably wondering why I didn't cover this radio or that one, as you may already have your own favorites. Please keep in mind that this is based on the receivers that I own or have owned. Most of these receivers weren't found by chance, but sought after specifically by me because I wanted to play with that specific make and model. I still have a few that haven't been restored yet, so they were not included in this article. All of these receivers have many of my hours of operation on them. As my collection grows, I will periodically add updates to this article.

At my operating position, I keep four receivers on line at all times, selectable by the turn of a knob. I quite often switch receivers even in mid-QSO to better use the "personalities" of the different receivers as conditions change. Always remember that receivers are like people, each one has it's own distinct and different personality.

In closing, I hope that this may help some of you that are undecided chose the receiver that best suits your style of operating. Many of the older receivers are wonderful pieces of equipment to own and very much a joy to operate. Many are not and are dismal disappointments when you fire them up. Hopefully between this article and John's (W3JN), you should be able pick a winner. Remember that old receivers are addicting, the more that you have, the more that you want!!!

De KB3AHE

(sometimes called The Slab Bacon)