



# HLARA RADIOGRAM

The Quarterly Publication of the Heartland Antique Radio Association, Inc.

July 2007 Edition

## Greetings from the President



We sat on the newsletter this time around so we could have a report on the Summer Sizzler while it was still fresh in our minds, not to mention the added workload of the Sizzler. Most of this article was sent out in an e-mail to the membership but the thanks bear repeating. A lot of people work very hard to put on this event every year and it would be impossible to pull off without them.

Our attendance was down a bit as we were conflicting with the car show and the un-earthling of the rusty car. That's hard to compete with! We had about 65 people sign in, some of those were families that just signed in on one line and my wife Lesli who was working the sign in table estimated another 20 people passed through without signing up. That would put it around 90 to 100 people. First and foremost, the Sizzler is a service to our members and in that respect we were very successful.

It takes a lot of hard work to pull this thing off so many thanks are in order:

Thanks to Vice Pres Dan Weilacher who did all the running, and check writing and everything else. Dan is an asset to the club and the radio community and the Sizzler literally wouldn't be possible without him. Thanks to John Anderson for stepping up and taking the Secretary position and being there every time the doors opened.

Thanks to my lovely wife Lesli who ran the front table and helped to keep me organized through the whole thing.

Thanks to Curt Lutz for taking over the radio presentation at the sizzler.

## Eaves Droppin'

By Andy Anderson

A conversation overheard at the Summer Sizzler Radio Show between **Andy Anderson** and a "Passer By"

"What is that thing?"

"That is a crystal set radio."

"A crystal set radio! I built a crystal radio when I was a cub scout. It didn't look like that."

"This is a 2007 version. They have some new technology now, some new circuits. They work a lot better. Still no tubes or transistors."



"I see stuff in there I never saw in a crystal set. What do they all do?"

"Well let me tell you friend, I first built one of these when I was fifteen. But now I am building them again with all these new circuits. It gets more stations. This here is what you may call an R F stage. The R F stage uses the funny looking coil and that old tuning condenser. It also "tunes" my antenna to work best for my set. You want to keep all of the radio signals you get from the antenna. If you lose something you don't have much left."

"OK, but you have another round coil over here."

"Well this one is kinda like the one in your cub scout radio. It's in the detector stage. Has a variable condenser to tune in the stations".

Thanks to Bob Shindhelm for stepping up and taking over the Treasurer Position and handling the financial affairs of the Sizzler. (paying Dan back for everything)

Thanks to Scott Petty for donating the doughnuts for the concession stand.

Thanks to all the members for taking a Saturday morning to support the club.

Thanks to the following sponsors:

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Petty's Fine Foods

Steve Adams and the Radio Attic

Joe Riddle and the Community Care Radio Theater (740 KRMG Radio)

Stan Tacker KRVT Radio 1270

Now that we have caught our breath, the HLARA leadership is working on more activities for the membership. Some things to look forward to are another radio tune up day, a field trip, the fall picnic and swap meet and possibly a vintage electronics class. We will do our best to keep things interesting and provide services to our loyal HLARA membership. Please stay tuned for more radio fun. Remember, this is your club and your participation will insure HLARA's continued success.

Chris Cunningham  
President, HLARA

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For more info see [HLARA.org](http://HLARA.org)

"Yes, but you have two of them and they are spaced a foot or so apart. Why is that?"



"This may not be like that fellah Curtis or Big Bob would explain it,, but you remember a 455 KC I.F. stage ? You have 2 coils separated a little and 2 trimmers to tune them with. That's where you get selectivity in a superhet radio. The two big coils work just like an I.F. Stage. So I have them just spaced so-so to get the most selectivity and still get a good signal."

"I think I can understand that. But what is that 3rd coil here off to one side?"

"That's a wave trap. Traps out other stations. If I didn't have it I would get KFAQ (KVOO) all over the dial."

"Oh Yes! I remember that. On my Cub Scout set we got KVOO all the time. One more question. What is that little white board here in the middle?"

"That's where the crystal is, like you had in your set where you poked the wire to the crystal. Except now we use diodes, 1N34 for instance. See the switch? I can select 2 or 3 different diodes, one may be louder than the others. Then we have a transformer to get the radio audio signal from the diodes to the headset. Now we use the "Sound Powered" headsets. Gives more volume."

"Sounds like a lot of stuff just to get some weak stations in a set of headphones. Why would anyone do all that?"

"Yes, I know. It's just like those other fellows here who collect old radios and try to get them to play. Why do they do that?"

# ZENITH TRANS-OCEANIC RECEIVER RESTORATION

Curtis A. Lutz

Being addicted to collecting old radios of many brands and types, I have always leaned toward Zenith receivers, mostly late 1930s consoles and larger table radios. I also have restored several dozen of the Zenith Trans-Oceanic (TO) portable radios in the past twenty years. The purpose of this paper is to provide tips and suggestions regarding restoration of these highly-collectible Zenith portables.

Zenith built millions of the Trans-Oceanics, and there were several other manufacturers, including Hallicrafters, Stromberg-Carlson and RCA who made some interesting radios that had very similar schematics and tube-complements. Most of these AC-DC/Battery portables had five or six tubes and most used a selenium rectifier (although some used a 117-Series tube as the rectifier). Zenith had a model or two that used loctal tubes, however, most of the Zenith Trans-Oceanics were equipped with a selenium diode.

In order to limit the length of this article, the discussion will concentrate mainly on restoration of a Zenith Y-600 Receiver; there are several other models which utilize the same or very-similar power supply systems, so much of the information will apply to several other Zenith TOs.

The first suggestion is that you DO NOT plug the radio into AC power before making some preliminary tests. One item you really should have on your test bench is a variac/isolation transformer; this item provides safety when working on any radio that will be connected to AC power, plus it allows gradual application of power which has several advantages, especially when there is any problem in the power supply or load on the power supply. The variac is also very important when servicing any radios that have series-string tube filaments, especially when they are these sensitive, low-voltage type tubes. Another reason for the variac is that it allows you to check the operation of the receiver over the specified AC input voltage range (most of these portable radios should operate over a range from 90 to 125 Volts); I'm amazed at how few TOs will operate at all below around 100 or 105 Volts, if they still have the selenium rectifier in the power supply.

It is a good idea to carefully test all the tubes in the TO before anything else. Then carefully remove the chassis from the cabinet so you can make some preliminary tests: To get the chassis out, you will need to remove the whip antenna, disconnect and remove the Wavemagnet antenna, remove one screw that goes through a metal bar into the top of the cabinet (near the coils at the left rear), and two screws that attach the chassis to the shelf on which it sits. Also, if the set has the cord reel, it is a lot easier to get it apart if you remove the plastic line cord escutcheon from the side of the cabinet. Most of these sets had a panel lamp that slips over a metal bar (this in front of where you removed that top screw mentioned above); pull the lamp holder assembly off the bar and remember to carefully guide it around the top of the tuner assembly as you slide the chassis out. You also must disconnect the three push-on lugs that connect the headset jack to terminals at the upper left corner of the speaker, and don't forget to pull off the two knobs from the front side.

At this point you really should have a schematic and related technical data covering the model you have. Figure 1 is a simplified schematic of just the power supply of a Zenith Y600; note that this same basic power supply design is used in several other Zenith TOs, such as the A-600 and the L-600, and a very similar design is used in the T-600.



Next I suggest you substitute a resistor for the tube chain, a 150 Ohm at least 1-Watt connected from pin 7 of the 3V4 socket to B- (outside lug on the filter capacitor is B-/A-). Now, put the 50A1 tube (if good) into it's socket, connect a DC voltmeter to B- and the positive lead to the B+ terminal of that Selenium diode, connect the line cord to your variac/isolation transformer output, turn the TO on, then slowly bring the variac up while observing the DC voltmeter. I usually only bring the input voltage up to about 60 volts, then check to see what you have across that 150 Ohm resistor -- should be around 4 volts with about half the normal line voltage. If things still look good, bring the line voltage on up to 115 or 117 Volts, then check for around 8 volts across that 150 Ohm resistor, then check the voltage across the input filter capacitor (C-1A), which should be around 105-110 volts -- however, without any tube plate current, this might be a little higher. OK, if all this checks out, shut it all down, remove the 150 Ohm resistor and put the good tubes back into their sockets, then use the variac to slowly bring up the radio as above (but now you need to be checking voltage drop across the series filament string -- from B- to the 3V4 pin 7).

Now is a good time to put a jumper across two terminals by the speaker (since the speaker voice coil is no longer connected through the normal contacts of the headphone jack).

As you slowly apply increasing line voltage, this set might start playing. In more than half of these portables I found that the selenium rectifier was bad, or weak, so the set either had no B+ voltage, or would not operate unless you applied over 110 Volts input. My suggestion is that you always replace that selenium with a silicon diode

Before you start replacing any other parts, now is the time to check several operating voltages. Connect the voltmeter negative lead to B- (outer lug of the main filter capacitor can), bring the line voltage up to 117.

Check again for about 8 volts at pin 7 of the 3V4 tube socket.

Check for about 115 VDC at the cathode of the rectifier.

Check for about 105 VDC across the input filter (C-1A).

Check for around 95 VDC across C-1B.

Check for around 50 VDC across C-1C (pin 7 of the 50A1 socket)

At this point, if the radio plays well, you should slowly turn down the AC input voltage, from the nominal 117 volts till the radio cuts out. The receiver should still operate with only 90 volts input. My experience is that four out of five TOs have a weak or dead selenium rectifier. It is a good idea to replace the selenium with a silicon diode. To do this, unsolder the two leads from the selenium diode, take the nut off the mounting bolt, slip the selenium off the screw and take out that long 6-32 screw. Now, install a two-lug terminal strip (both lugs isolated from chassis) using a shorter 6-32 screw at the same position. Next install a 1-Amp, at least 400 PIV rated silicon diode on the two isolated terminals and reconnect the two leads to this replacement diode. When installing the diode and reconnecting the leads, do observe polarity of the diode -- the banded end is the cathode (B+).

Figure 2 below is a photo of a Y-600 chassis which appears to be original, showing the selenium rectifier at the upper left corner, and all the original capacitors.

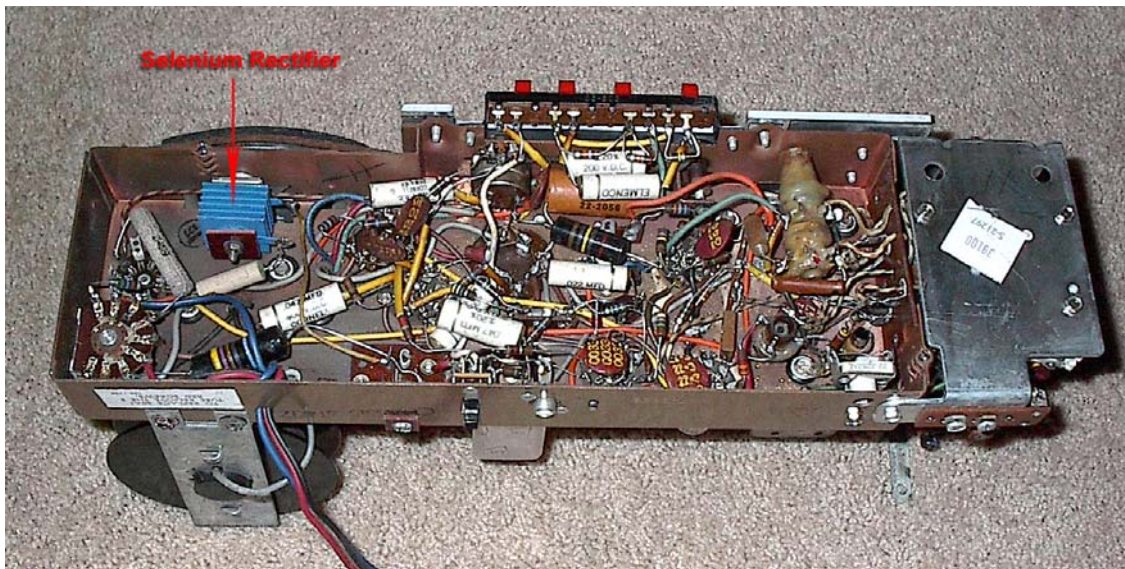


FIGURE 2

When this diode has been replaced, I suggest again slowly bringing up the set with the variac/isolation transformer, while your DC voltmeter is connected from B- to the 3V4 pin 7. You may find that the filament voltage now runs slightly high, as the forward resistance of a silicon diode is less than that of a selenium. So, measure all the A and B voltages with 117 volts AC input, and, if these are running high, you should insert a resistor in series with R-31 (the 130 Ohm surge resistor), usually a 10 or 15 Ohm wire wound takes care of the needed voltage drop, but, be certain that this resistor is at least a 5-Watt rating, otherwise it will run hot and not last. After installing the additional dropping resistor, run the voltage measurements again, all of which should now be within two or three percent of those indicated on the schematic.

My usual procedure is to replace all the paper-dielectric capacitors and all four of the electrolytic capacitors in each Trans-Oceanic receiver. In the chassis shown, I did not replace the electrolytic caps, as they all checked good in this radio. To replace the four filters (which were originally inside a can mounted on top of the chassis) -- with only the lugs protruding under the chassis, you will need to use some careful planning, in order to install four new capacitors in the crowded under chassis space available. I mount a five lug terminal strip at the front edge under the chassis (you will need five lugs that are isolated from the chassis), one for A-/B- and four others to replace the four positive lug connections of that original filter capacitor can; connect one wire from the nearest A-/B- (outer lug of the old capacitor can) to one lug of the new terminal strip (usually to the center lug) for use as the common negative for all four of the replacement capacitors. Leave in place all the original wires/leads that are connected to those outer can lugs. After installing the five lug strip, carefully remove all leads from C1A and transfer to a lug on the new terminal strip. Next do the same for C1B, C1C and C1D. Any wires that are too short to reach will need to be replaced or extended (use heat shrink tubing if you splice in extension wire, or replace the lead back to where it came from). Now, observing polarization, replace each capacitor section with an appropriate value and voltage rated capacitor. Fortunately, new electrolytic caps are tiny and can be located in the available space below the chassis. Use 150 or 160 Volt rated capacitors to replace C1A, C1B and C1C. However, for C1D you should use a capacitor rated at 10 VDC (certainly not more than 25 VDC), otherwise the effective capacitance will be significantly-reduced. For C1D (the filament voltage filter), it is a good idea to use a filter with 200 uF to no more than 300uF, as the turn-on surge through a larger capacitor can be harmful to the 3V4 filament.

Figure 3 is a bottom of chassis photo showing the modified Trans-Oceanic, with the silicon diode and all the small paper-dielectric capacitors replaced.

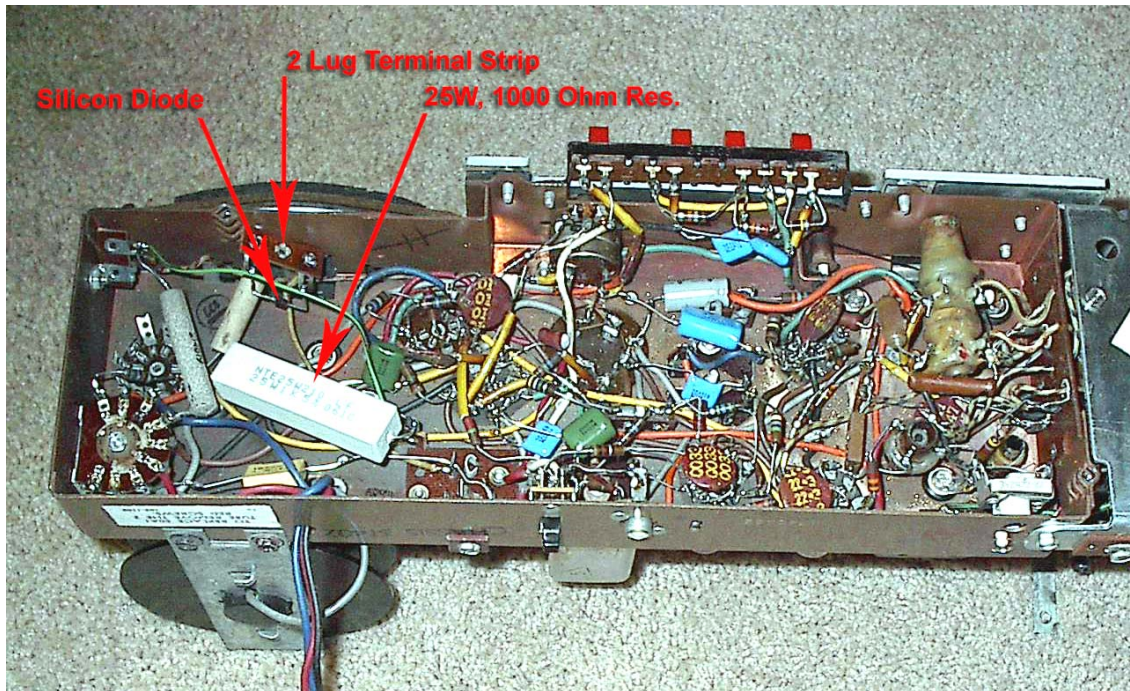


FIGURE 3

REGARDING TUBES USED IN THESE PORTABLE RADIOS: Assuming that all the tubes are good (no shorts, no open filaments or weak ones when you test them in a good tube tester), don't assume that every tube will work in the radio. Since these tube filaments are connected in series when operated in the radio, you might find a tube that tests good but is non-functional when used in the series string mode. Keep in mind that when in the tube tester, the filament voltage applied is a fixed value (1.4/1.5 Volts or 2.8/3.0 Volts) for the respective types, however, when operated in a series-string configuration, the actual voltage drop across each tube filament is determined by the individual filament resistance of each tube; more than once I have found one tube in the string that was not conducting, due to the fact that the filament had a low resistance, such that the current through that tube did not develop enough voltage/filament heat to cause emission. Replacing the tube with another (tested good) tube of the same type solved the problem. While this is a rare problem, I have had at least three cases where a tube tested good in the tube tester, but was non-functional in the set. Most of these tubes are still available at reasonable prices; however the 1L6 tube is expensive, even if you can locate one for sale. This is one reason why I suggest the test procedures previously listed, to avoid blowing tube filaments, particularly the 1L6. Radio Daze catalog lists a 1L6 tube at \$44.95. Antique Electronic Supply shows it at \$49.40 each. There is no known direct substitute for this 1L6 tube, however, there is a tube that can be modified to replace a bad or missing 1L6; the 1R5 tube has the same filament voltage and current ratings, but has different basing terminations. In order to use the 1R5 in place of a 1L6, you will need to take a close cutting side nipper and cut pin 5 off very close to the glass, then take a file and gently reduce any remaining metal of pin 5 so that there is no chance of that pin contacting the metal socket contacts. After removing pin 5, this tube could easily be inserted incorrectly, so be careful that the tube is inserted with pins 1 through 4 and pins 6 and 7 in the proper socket contacts; double check that you have it inserted correctly, or you could cause damage. I have done this 1L6 to 1R5 conversion on a number of radios, and it usually does not work as well as the 1L6 tube; the change seems to work well in portables that are strictly broadcast band receivers (no shortwave).

When you are finished re-capping the radio, it is best if you take the time to carefully measure the actual voltage drop across each of the tube filaments. BE VERY CAREFUL when doing this, as a slip with a probe can be disastrous, possibly resulting in burning out one or more tubes. So, to measure each tube filament I like to use a set of test leads that terminate in those tiny alligator clips with insulators over all but the very ends of the clips. With the set turned off, carefully avoiding any contact except to the desired pin 1 or 7 of each tube, attach the little clips to one tube, variac up to 117 VAC input and note the filament voltage for that tube; repeat this procedure for each tube -- you should have between 1.4 and 1.5 volts drop across each tube (except the 3V4 should have 2.8 to 3.0 Volts from pin 1 to pin 7). If you find a tube that has more or less voltage across its filament, the tube may have filament resistance that is too high or too low, so try replacing the suspect tube with another of the same type and re-measure the voltage drop.

Now, with all the filaments operating with correct voltage (and correct current flow), it is time to check all the operating voltages at the plates and screens of these tubes. Use the schematic and with the set operating check from B- to each plate and to each screen. These voltages differ and will be from around 20 Volts to as high 90 Volts (per the schematic indications); all should be within 10%. If any falls out of the + or - 10% area, turn the set off and check plate load and all isolation resistors, as it is likely that one or more of them have changed value, or there could be a leaky bypass capacitor.

Regarding bias for the 3V4 output tube: Note that this tube operates at the positive end of the filament string -- that is, the 3V4 filament (which is the cathode) is operating at an average voltage of +6.75, with respect to B-. In other words, the cathode of the 3V4 is at +6.75 volts, while the grid gets a DC input voltage of +1.5 Volts. Since bias is the grid to cathode voltage, this 3V4 tube has a bias of -5.25 Volts. To verify this, measure from the center tap (pin 5) of the 3V4 tube to pin 7 of the 1U5, and you should get a reading of about 5 Volts (with the cathode being positive with respect to the grid). Another way to measure this bias is to measure from the grid of the 3V4 (pin 6) to B-, which should have about a +1.1 volts grid voltage.

REGARDING THE PANEL LIGHT: the Y-600 and most other TOs include a simple panel lamp circuit that is totally independent of the power supply. Zenith originally used an odd 1.5 volt carbon-zinc battery to power this panel lamp; the battery was about the same diameter as a standard D-cell, but was about twice as long. I replace that battery with a standard D-cell, by installing a single D-cell holder and wiring it directly to the two leads that came down to the battery compartment. Just remove that little two-pin plug and wire to the battery holder leads. Check the light by operating the spring-return switch on the front. If the bulb is bad, replace it with a type 112 Lamp (available most any hardware store). This lamp is rated at 1.2 Volt, 0.22 Amp, and is a pre-focused type normally used in tiny single-cell flashlights.

ALIGNMENT: OK, with the set operating at any AC input voltage from 90 through 125, my next step is to do a complete alignment job, with the line input voltage set to 117. This requires a very-accurate signal generator, and either a good VTVM or FET (high-impedance) meter to measure AVC voltage during alignment, or, a highly-sensitive AC VTVM to measure the low audio AC across the voice coil of the speaker. Use only an analog type meter for alignment, NOT a digital type. I prefer monitoring audio output as the indicator, rather than using AVC, as this method has zero effect on the bias system and is more accurate. Always remember to keep the volume control at or near maximum during alignment, and always keep the signal generator output to the lowest possible level that will allow reading on your output (or AVC) indicator. The lowest AC voltage scale on most VTVMs is 1.5 Volts full scale, so these are not sensitive enough to use as tuning indicators across the voice coil. Good AC VTVM units include HP Model 403B (.001 to 300 Volt ranges), and many others such as Heathkit, EICO or Tenma (MCM Electronics). If you use AVC voltage as a tune-up indicator, do not use a VOM (low Ohms-per-Volt) type meter, as this will load down the AVC circuit and result in alignment errors. Most hobbyist signal generators are not very accurate and produce a horrible saw tooth RF waveform with strong harmonics. One of the finest signal generators is the Sencore Model SG-80, however, it provides only standard broadcast band and the FM band outputs (no Shortwave bands). Suggested generators are military

units such as the AN/URM-25 series, which can be purchased on eBay for about five to ten percent of what Uncle Sam paid for them. Best hobbyist generators would be the EICO Model 315 or the RCA Model WR-50B, but I suggest you employ a frequency counter to verify output frequency accuracy.

**PUTTING IT BACK TOGETHER:** When you are satisfied that you have completed the restoration and the radio is tested and aligned, you might want to clean up the cabinet inside and out, possibly touch up the leatherette or, in some cases recover it (if the covering is torn and/or has badly worn through areas -- usually on the corners). Many TO restorers use Black shoe polish to coat the leatherette, and especially those bare or threadbare spots on corners. So, when you get ready to reassemble the radio, carefully route the dial lamp with it's wires, also the three leads coming from that headphone jack, plus you will need to route the AC plug through that hole in the side of the cabinet as you move the chassis into place. Once you have it in place, re-install the panel lamp on the little bracket, re-connect the three color-coded wires at the speaker terminal strip and be certain that the AC Plug is through it's opening. Now you can reinstall the little screw that goes up into the cabinet top, the two screws that bolt the chassis down and the plastic cord escutcheon. Also check the Wavemagnet loop antenna to be sure it has continuity and reinstall it. From the front side, install the two knobs, plug it in and check it out.

If you want a variac/isolation transformer, there are four options: You can build one, I can build one for you, you probably could purchase one on eBay, or check out the Tenma unit, P/N 73-1097, available from MCM electronics, Centerville, OH. One of the best is the Sencore PR57, often available on eBay.

Good luck, and, if you have questions or suggestions, please do not hesitate to contact the author.

Curtis A. Lutz, Broken Arrow, OK Phone: (918) 251-4915 e-mail: [OldeRadios@cs.com](mailto:OldeRadios@cs.com)



I recently wanted to make a thank you card for a friend but thought it would be nice to make it radio related. I took a picture of my Stromberg-Carlson Dynatron sitting on the table near my PC. I then uploaded it, used a program I have called Digital Image Pro and created the neat picture you see here. You can change the degree of "sketch" effect in many ways. I really like the look and if you would like to have this done to one of your radios and don't have a program to do it, just email it to me. I will convert it and send it back to you. It's great fun to use on cards, stationery or whatever else you can think of. E-mail [dan.weilacher@hlara.org](mailto:dan.weilacher@hlara.org)



# ***SStran AM Transmitter***

By Chris Cunningham

*Disclaimer: The opinions and reviews in this article are based on research and personal experience of the reviewer and do not necessarily reflect the views and opinions of the Heartland Antique Radio Association, Inc., it's members or it's subsidiaries. So there!*

Those of you who know me know that I tend to be a bit frugal. (my wife says tight) When I pry open my billfold, shoo away the moths and dispense with \$107.00, it's going to be for something good.

I had been contemplating the purchase of an AM transmitter for some time. It seemed wrong to spend all that time and money to restore a beautiful old radio just to listen to the melodious voice of Rush Limbaugh streaming out of the Golden EIB Microphone. It seemed more natural to listen to something that would have been coming out of the radio 70 years ago when it was new. It so happens I have a lifetime supply of vintage radio programs I have collected over the years. The question was, "How do I get these great old programs together with one of my great old radios?" The answer of course was my own transmitter.

Now I had several choices. I wasn't about to purchase something pre-built. That wouldn't be any fun and would be too expensive. (Remember tight?) So now I was down to two paths; scratch built or kit. I typed "am transmitter" into Google and was presented with several units.

The first unit I came across was the Li'l 7 one tube transmitter on **Phil's Old Radios** web site. <http://www.antiqueradio.org> The Li'l 7 is based on the 1930s style wireless phono adapter. It's powered by a single 117L7 tube. It's a neat little circuit but the reviews from the people who built it said the range was very limited and the frequency would tend to drift. This wasn't acceptable as I have a big two story house and I wanted solid wall to wall coverage plus a good portion of the yard.

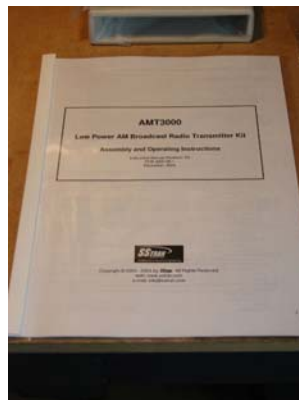
My next choice was the Ramsey AM25. Ramsey has been around for years and produces many kits of all types. Once again, a little research revealed the people who had built the kit ran into a few problems. The range was somewhat limited and apparently the sound quality just wasn't good. This wasn't acceptable as many of my radios, especially the consoles, are capable of extremely good fidelity. Nothing sounds like a vacuum tube amp.

Finally, I ran across a critter called The SStran. The price for the kit was less than \$100.00. I started searching the internet to find out what problems this kit had. Much to my surprise, I couldn't find a single disparaging remark. Everyone who had built the kit gave it glowing reviews. It was even compared to a FCC certified transmitter that sells for \$900.00. The reports were that it performed as well as or better than the certified unit. It looked like this was the one. I whipped out the credit card and in four days, I was in possession of my new transmitter kit.

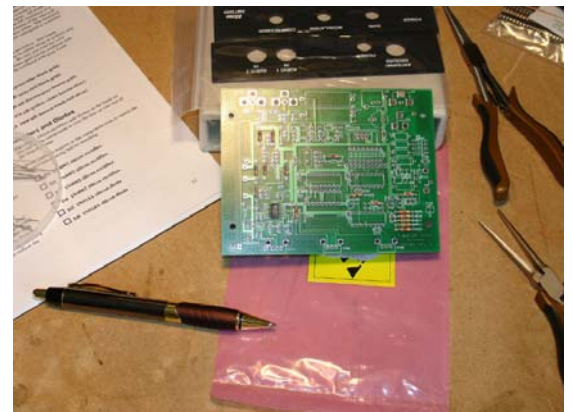
Before we dust off the soldering iron, let's talk about the transmitter. The SStran AMT3000 is a solid state (no tubes) 100mw transmitter that covers the complete commercial AM broadcast band from 550Khz to 1700Khz. It uses a phase locked loop circuit to keep the transmit frequency dead on and has an on-board sound processor that we will talk about a little later.



Contents of kit



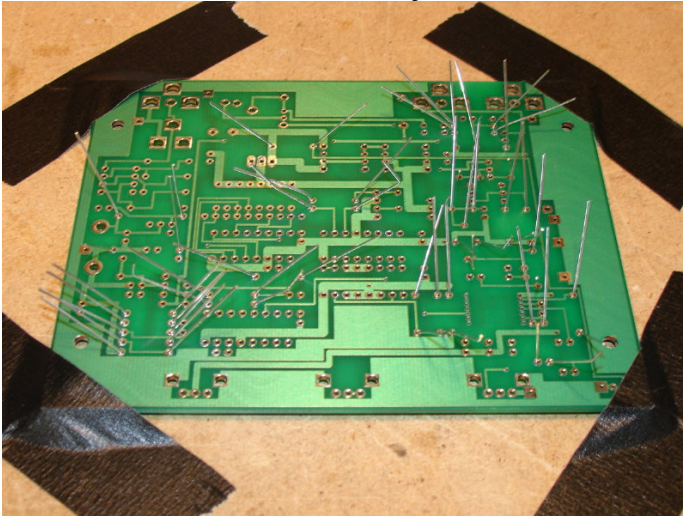
Instruction book



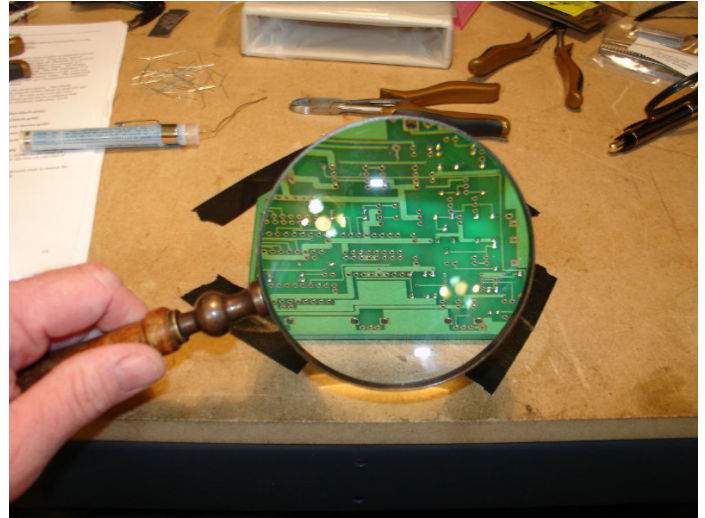
Motherboard

I opened the box and unpacked all the goodies. Everything was well packaged and labeled. It reminded me of a Heathkit kit from days passed. The high quality injection molded case was smaller than I expected. I don't know why I expected it to be bigger. The assembly / operating manual is well written and well illustrated. I laid out all the parts and took an inventory. Everything was there and I was ready to go. I read the assembly instructions thoroughly before starting. Now is a good time to talk about eyesight and steady hands. The kit has about 100 parts but is fairly easy to assemble, with one exception: The marvelous on-board audio processor is a surface mount device. For those of you who don't know, surface mount devices are extremely tiny and require special soldering equipment. It can be done with a very fine tipped iron, extremely steady hands, and perfect vision. I'm afraid I no longer have any of these things. For an extra three dollars, the SStran people will solder this one component onto the circuit board for you. You would have to be a nut not to take advantage of this service.

The circuit board is very high quality and has images and values of the components silk screened on the board in the proper places. I sorted out my parts and began stuffing the board. I would insert four or five components and bend the leads a bit to hold them in place. I would then check them off the list. I would then flip the board and solder the leads. After soldering, I would check them off a second time. I proceeded through the entire kit in this fashion. Keep your meter handy. I had a little trouble distinguishing the colors on the resistors so I checked each one with the meter just to be sure.



Resistors in place and leads bent



Magnifying glass at work

I'm not going to bore you with the step by step details of the assembly. The instructions are excellent and don't need any help from me. I will cover a few details and give you a little advice based on my experience.

I spent about five hours on a Saturday afternoon assembling the kit. It could easily be done in two hours but I took lots of breaks and was very meticulous. The high parts count might be a bit intimidating to a beginner, but if you know how to solder and follow the instructions, you won't have any problems.

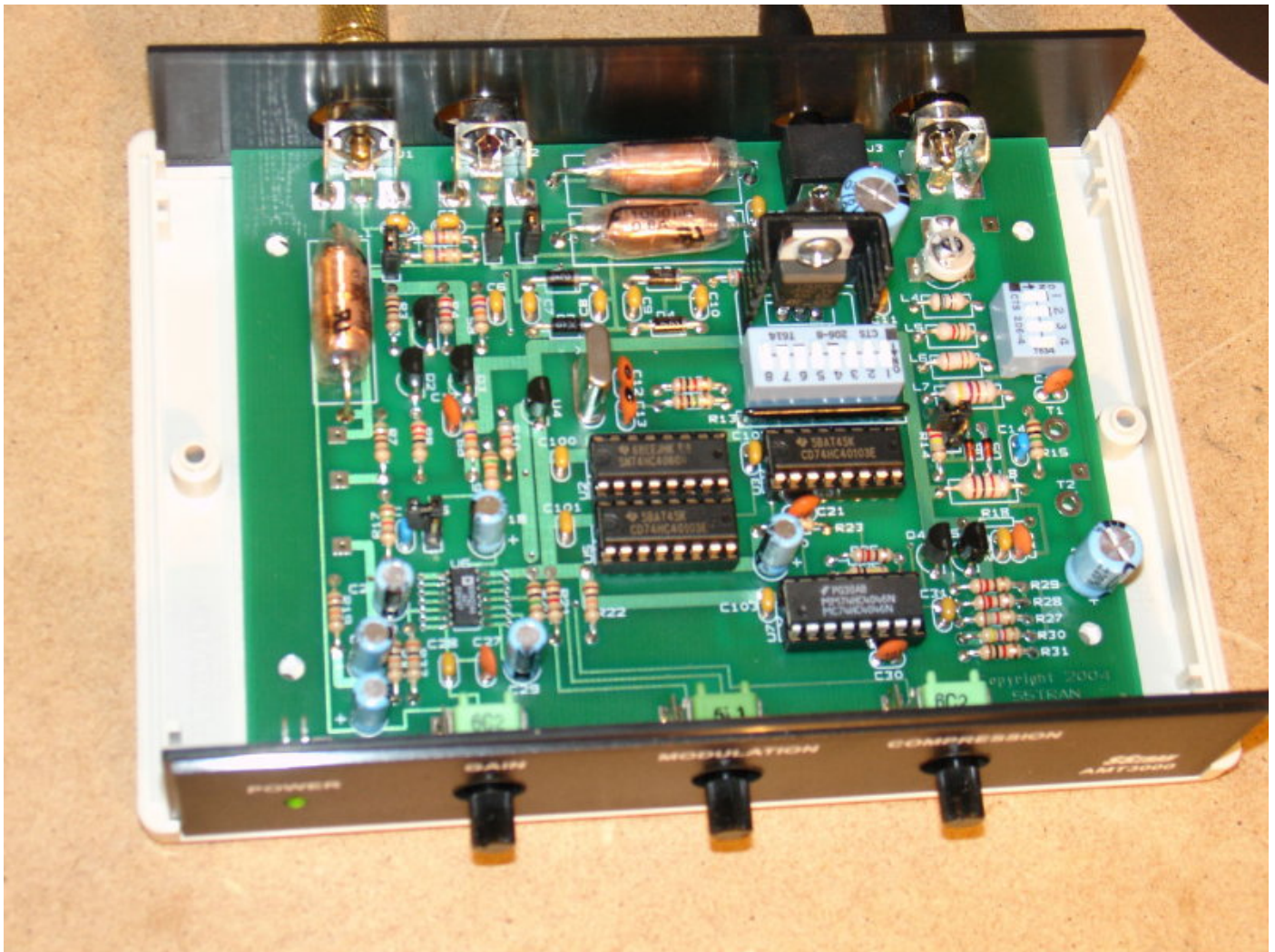
Here are some pointers.

- \*Buy the kit with the surface mount component pre soldered.
- \*Verify your resistor values.
- \*Practice soldering if you haven't worked on a circuit board in a while.
- \*Use a sharp Xacto knife to separate the pin jumpers.
- \*Use a rubber band or a piece of tape to hold the IC sockets in place while soldering.
- \*Take your time and double check everything.
- \*Use a magnifying glass to check your solder points.

Now that you have everything assembled, let's try it out. The SStran comes with a wall wart power supply however, the unit will operate with any 15 to 20 volt AC source. Power supplies are often a source of noise in transmitters and receivers so to eliminate this problem; the SStran has the rectifier and filter circuit on the board assuring a good, clean source of DC current. There is no power switch. The transmitter runs cool and will last a lifetime even running 24 / 7. Audio input can be line level such as the tape out jack on your stereo, low level audio

from the headphone out on your Ipod, CD, tape player, or computer speaker out, or high level audio from the speaker output of your stereo. The SStran is a mono transmitter but has stereo inputs that are summed into a mono signal so that no audio information is lost. I use a 1/8 inch pin to RCA plug patch cord to drive my transmitter. My audio source is usually my laptop where all of my radio shows reside or my Apple Ipod mp3 player. Both work equally well.

Pin jumpers on the circuit board are used to insert or remove inductors from the circuit to take care of any hum problems from ground loop interference. I didn't need to use them but it will depend on your configuration. Read the instructions for details. The transmit frequency is set by a bank of dip switches in the circuit board. The higher the transmit frequency, the better the range. Higher frequencies match the short wire antenna more closely for more efficient signal transmission. Once you have set your frequency, you will set another bank of dip switches according to a chart included in the instructions. This is the antenna matching circuit. After setting these, you use your VOM to peak the signal by adjusting a trimmer on the board.



Complete SStran board and controls

The transmitter has three controls on the front panel; MODULATION, GAIN, and COMPRESSION. Maximum signal strength and volume is achieved by twiddling these controls. This is where the great audio processing circuit comes into play. Start with MOD and GAIN turned half way up and compression turned fully counter clockwise. Feed an audio signal to your transmitter and tune your radio to receive the signal. You should hear your programming coming out of your radio. Crank the gain up and then start backing it off just until you here the volume start to decrease. This setting limits the audio signal peaks to prevent overdriving the transmitter. Start turning the MOD control up until the signal sounds distorted then back it off until the audio is crisp and clear. This

sets the modulation to 100%. With the modulation adjusted for 100% the gain control limits the audio so that you don't over modulate. I checked my modulation with an oscilloscope but that was just for fun and isn't necessary.

The COMPRESSION control is a matter of taste. When you compress an audio signal, it evens out the volume of the signal. A good example is classical music. The loud passages will blow you out of your chair but the soft passages are almost too soft to hear. If you compress the audio, the soft passages will be louder and closer in volume to the loud passages so the volume level of all the music is more even. Turning up the compression will make your signal sound louder. You'll here this on commercial radio stations that seem to blast out of the radio. They are using high compression. Most old time radio shows benefit from some compression. It makes them easies to hear. Too much compression however will make your ears tired and increase the noise level. I have mine set about 1/5 of the way up. That seems to be plenty.

I haven't been able to find a single fault with the SStran AMT 3000. It sounds great, better than the commercial stations. The signal strength with the included 10 foot wire antenna is sufficient to cover my entire house, front and back yard, and about half way up the block in both directions. It's great to be able to tune in quality programming on my vintage radios. If you are a first time kit builder, don't be intimidated. Just take your time, be meticulous, and you will have a transmitter that will serve you well for a lifetime. Dan, John, and I have all built one and will be glad to help you if you need it. If you purchase a kit, bring it to the next radio tune up day. It would be a great project for a Saturday and everyone will be there to help if you need it. The kit including shipping and pre soldering the surface mount component is about \$107.00. I promise you won't be disappointed.

The SStran website is:

<http://www.sstran.com> or you can e-mail Phil at: [info@sstran.com](mailto:info@sstran.com)



“On The Air”

SStran 3000 with XM radio transmitting Frank Sinatra  
How much better can it get?

### Upcoming HLARA Events

Aug. 16<sup>th</sup> Membership mtg. - Nathan Hale Library  
Sept. 8<sup>th</sup> Radio Tune-Up - Weilacher's Radio Bar  
Sept. 20<sup>th</sup> Membership mtg.- Nathan Hale Library  
Oct. 6<sup>th</sup> Fall Picnic – Broken Arrow City Park  
See [HLARA.org](http://HLARA.org) for more info on these events.

### Regional Events

August 18<sup>th</sup> [VRPS](#) Summer Swap Meet  
October 16<sup>th</sup> [OKVRC](#) Fall Swap Meet  
See clubs websites listed above for more info.