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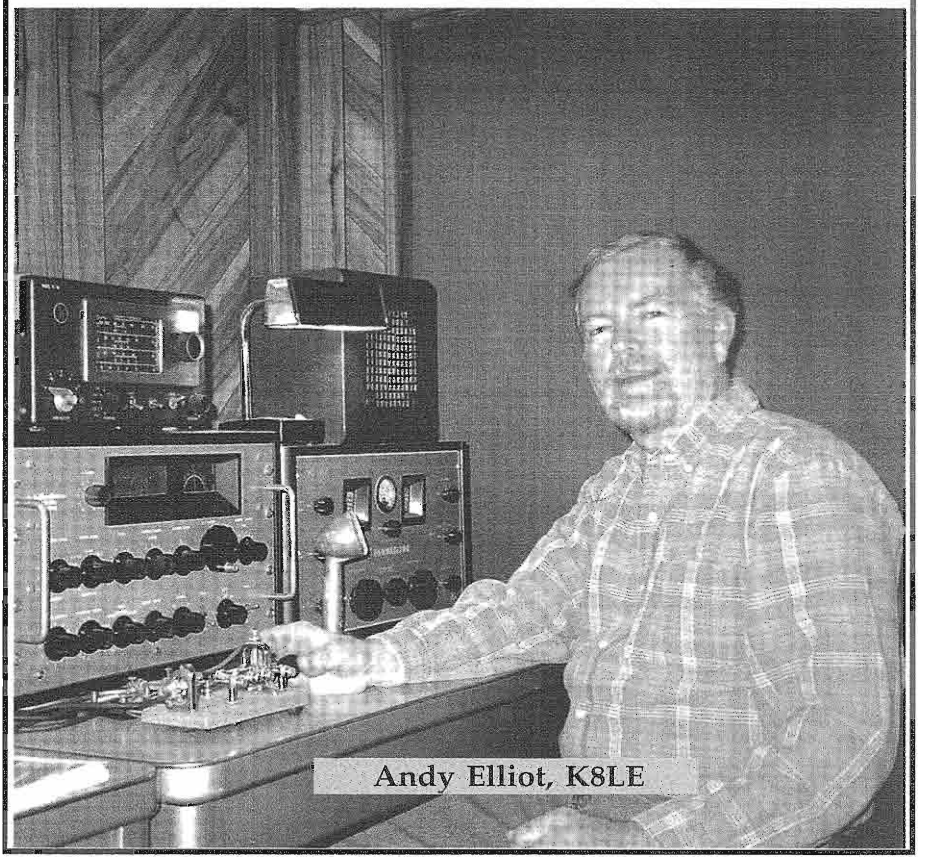
ELECTRIC RADIO

celebrating a bygone era

Number 177 February 2004



Andy Elliot, K8LE

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Electric Radio is dedicated to the generations of radio amateurs, experimenters, and engineers who have preceeded us, without whom many features of life, now taken for granted, would not be possible. Founded in May of 1989 by Barry Wiseman (N6CSW), the magazine continues publication for those who appreciate the intrinsic value of operating vintage equipment and the rich history of radio. It is hoped that the magazine will provide inspiration and encouragement to collectors, restorers and builders.

We depend on our readers to supply material for ER. Our primary interest is in articles that pertain to vintage equipment and operating with a primary emphasis on AM, but articles on CW, SSB, and shortwave listening are also needed. Photos of Hams in their radio shacks are always appreciated. We invite those interested in writing for ER to write, email, or call.

Regular contributors include:
Bob Dennison (W2HBE), Dale Gagnon (KW1I), Chuck Teeters (W4MEW), Bruce Vaughan (NR5Q), Bob Grinder (K7AK), Jim Hanlon (W8KGI), Brian Harris (WA5UEK), Tom Marcellino (W3BYM), John Hruza (KBØOKU), Bill Feldman (N6PY), Hal Guretzky (K6DPZ)

Editor's Comments

Proposed Regulatory Changes

ARRL has proposed major changes to the Amateur Radio Service. Below is a partial copy of their press release:

NEWINGTON, CT, Jan 19, 2004—The ARRL will ask the FCC to create a new entry-level Amateur Radio license that would include HF phone privileges without requiring a Morse code test. The League also will propose consolidating all current licensees into three classes, retaining the Element 1 Morse requirement—now 5 WPM—only for the highest class. The ARRL Board of Directors overwhelmingly approved the plan January 16 during its Annual Meeting in Windsor, Connecticut. The proposals—developed by the ARRL Executive Committee following a Board instruction last July—are in response to changes made in Article 25 of the international Radio Regulations at World Radiocommunication Conference 2003 (WRC-03). The entry-level license class—being called "Novice" for now—would require a 25-question written exam. It would offer limited HF CW/data and phone/image privileges on 80, 40, 15 and 10 meters as well as VHF and UHF privileges on 6 and 2 meters and on 222-225 and 430-450 MHz. Power output would be restricted to 100 W on 80, 40, and 15 meters and to 50 W on 10 meters and up, thus avoiding the need for the more complex RF safety questions in the Novice question pool. The middle group of licensees—Technician, Tech Plus (Technician with Element 1 credit) and General—would be consolidated into a new General license that no longer would require a Morse examination. Current Technician and Tech Plus license holders automatically would gain current General class privileges without additional testing. The current Element 3 General examination would remain in place for new applicants. ...Morse Code Testing Retained for Extra...

"This structure provides a true entry-level license with HF privileges to promote growth in the Amateur Service," Harrison said. The ARRL license

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Cover: Andy Elliot, K8LE, operates his favorite equipment, a Hallicrafters HT-20 Transmitter and Hammarlund HQ-140X, from Reynoldsburg, OH. Andy bought the HT-20 in 1960 when he upgraded from Novice to General.

Restoring a Pair of National NC-300s

by Larry H. Will, P.E., W3LW
1055 Powderhorn Dr.
Glen Mills, PA 19342

Introduction

The National NC-300 was one of the last "boat anchor" receivers offered by the National Company of Malden, MA. Last year at the Dayton Hamvention ® I found a pair of these in not too great a shape that were asking to be restored. As a young Ham in the early 1960's, another Ham in my area was using one of the NC-300's in VHF setup and the large slide rule dial and the external VHF converters intrigued me. Having an NC-300 to "play with" seemed like a good project so off they went into our group SUV for the trip home.

The two radios sat in my basement all year while I worked on the RCA AM rig written up earlier. [RCA BTA-1R1, ER #172, September 2003] With some early snow in eastern PA this year, it was time to start on the rigs. Having two to work on at once made the job easier.

Initial Testing

Both radios were put on the bench and much to my surprise, both of them worked after a fashion. One of the radios was clearly older than the other and much worse cosmetically but the "older" one actually worked better than the newer one on this first test. The newer one had a cracked and broken dial scale. (More on that later.) Both radios had the National crystal calibrators installed. No VHF converters were available.

For these receiver restorations, I decided to replace only those parts that were actually failed or out of tolerance. I think that one can do more damage replacing everything whether it needs it or not. For example, miniature tube socket pins with 3 or more wires attached make of a challenge for "safe' parts removal.

To make the job easier, I had a copy of the NC-300 manual and all the factory mod bulletins. These are available from several sources. I make extra copies of the schematics to make troubleshooting easier. I spent some time reading the entire manual and the factory recommended modifications cover to cover before I started on the restoration. I decided that the initial restoration would be to original factory specifications. With some exceptions noted below, the many suggested modifications could come later.

Restoration

Both radios were set up on the bench and worked on simultaneously. The older set, in particular, had a fairly corroded chassis top. Since most of the tube sockets and many other parts are riveted, I decided to just clean up the chassis top as best I could and not attempt a complete replating. Naval Jelly and various cleaners worked well here.

Electrically, what I found was that, especially with the older unit, the real problem was many out of tolerance (over 20% high) resistors rather than very many bad capacitors. These bad parts were present throughout the sets including a few in the RF "deck". To get at parts around the RF amplifier and mixer required complete dismantling of that assembly. **Figure 1** shows the RF deck "hanging out". This process actually went pretty well as the oscillator tube was mounted on the

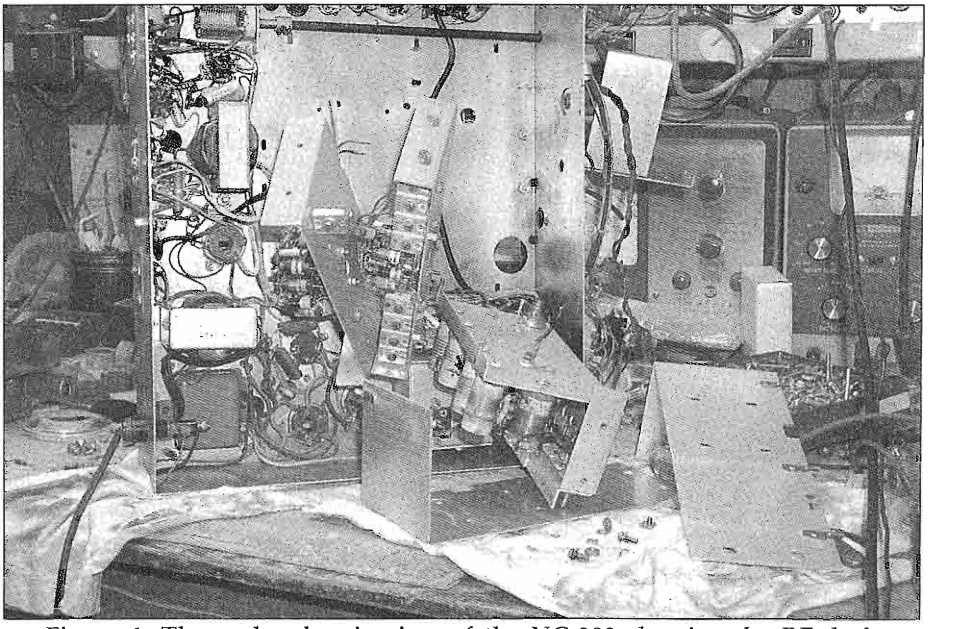


Figure 1: The under-chassis view of the NC-300 showing the RF deck assembly "hanging out."

subchassis and it all came apart and went back together just fine. For easier access, I removed both side panels from the chassis. Putting those panels back on required some dexterity and the use of "Heathkit" style nut starters made out of carefully selected lengths and diameters of shrink tubing. In both radios, the S-Meter amplifier circuit needed a reduction in the value of the cathode resistor to insure easy zeroing of the S meter on a quiet signal. The National service bulletins have several modifications to the S Meter circuit, some of which I might incorporate later. As stock, the NC-300 meter appears to be real generous in signal reports. I obtained some plastic scratch remover and polish to clean up the S-meter face in the older receiver but have not actually used those materials yet.

The front panels were removed completely. The entire mechanical system for the band select and tuning was disassembled, cleaned, and lubricated with WD-40 type light oil. See **Figures 2 and 2A**, which show the open front before work was started. Make note of how all the parts go especially with the outer shaft support bracket where some bolts are longer than others and there are many spacers that have to go back the way they came out. This process included freeing up the 2 gears of the anti-backlash assemblies which were "gummed up' by old lubricant. The wiring and switches in this area were very dirty and everything was cleaned with De-Oxit® or with Fantastic® for the wiring itself. The corroded headset jack was replaced on the older receiver.

Also, on the older radio, I removed the main tuning capacitor and completely cleaned and re-lubricated the unit. As a result, the spring loaded gear drive had to be re-loaded upon re-installation. Patience is the word here but it can be done. A small C-clamp can hold the pre-loaded gear during reassembly. After cleaning, the main tuning dials on both receivers "spun" and tuned like one would expect of a Na-

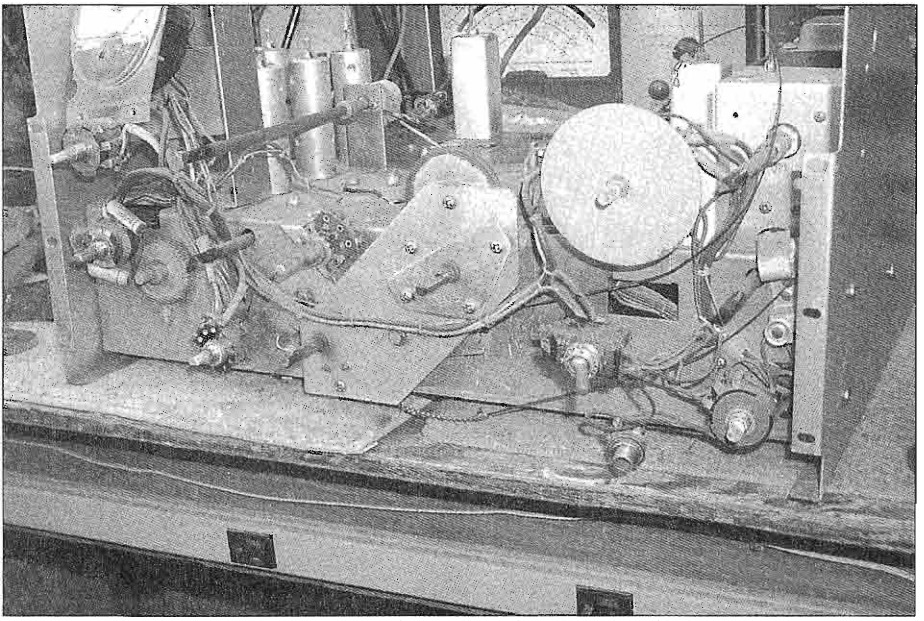


Figure 2: A closeup that shows the band changing and main tuning mechanisms intact.

tional receiver, i.e. very smooth.

IF Alignment

Before tackling alignment, I should mention the original 4H4-C oscillator voltage regular. These ballasts are hard to find and both of my radios use a 6V6 as a substitute. The 6V6 appears to do the job nicely and the voltage on the HF oscillator, V7, is very close to 6.3 volts. In one of the radios an 0A2 tube had been substituted for the 0B2 and that was corrected before the complete alignment was started. One receiver had noticeably lower IF gain than the other and this was traced to 2 weak tubes in the IF chain.

Before reassembling the front panels, I completed the CWO, low and high IF alignments exactly as outlined in the NC-300 manual. I have an IFR FM/AM 1000 service monitor so generating the 80 kcs low IF signal exactly on frequency was no problem. If you follow the National alignment procedure, the rig tunes up as it should. The bandwidth checks were as shown in the manual.

For the 2215 kcs high IF, the National book states that the frequency is approximate, being determined by the actual high IF crystal filter frequency. Again, the manual walks you through the procedure. The first time around on the first receiver, I did not "nail it" so I did the whole alignment again and the second time was a charm. The IF bandwidth and the phasing circuit bandwidth procedures performed correctly as shown in the National manual on both receivers. The actual IF was pretty close to 2215 on the newer receiver but several kcs different on the older one.

Cabinet, Front Panel, Knobs and Dial Cords

The two cabinets have not yet been cleaned up and repainted. Both need to be taken down to bare metal and started over. The newer cabinet has a solid section on the underside of the front of

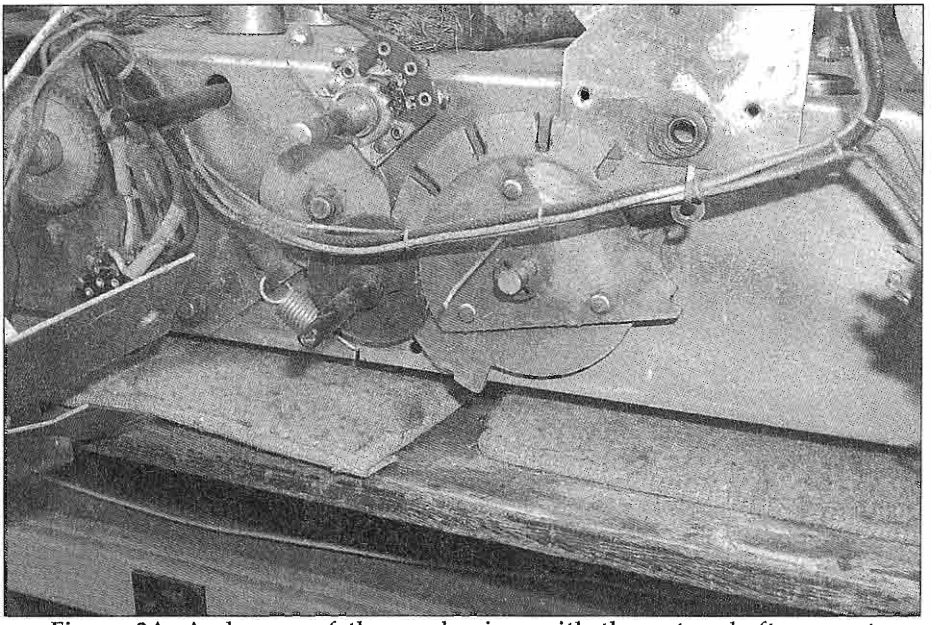


Figure 2A: A closeup of the mechanism with the outer shaft support bracket removed.

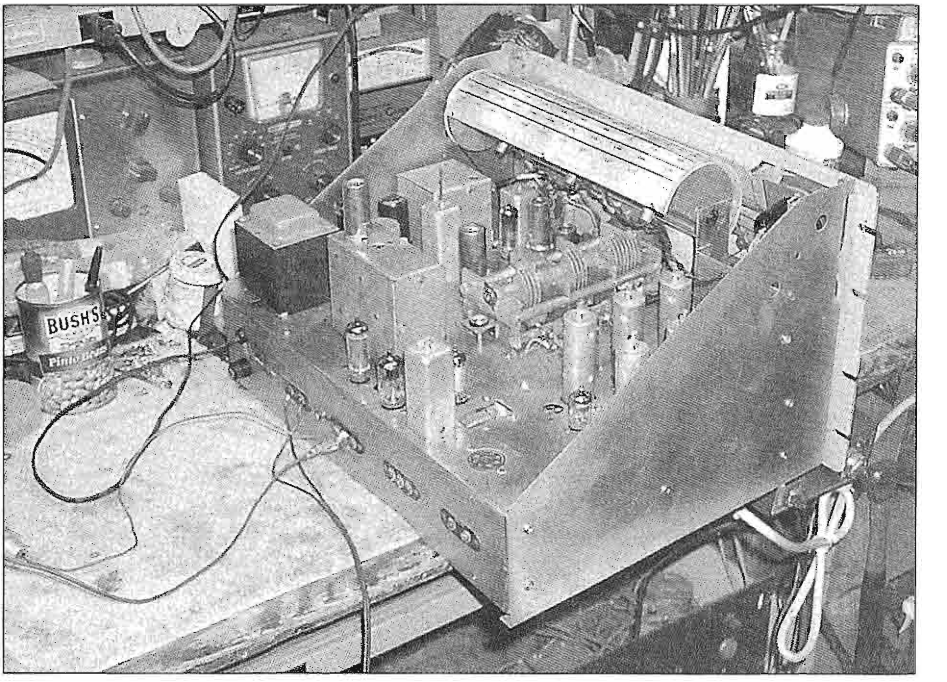


Figure 3: A rear view of the restored receiver.

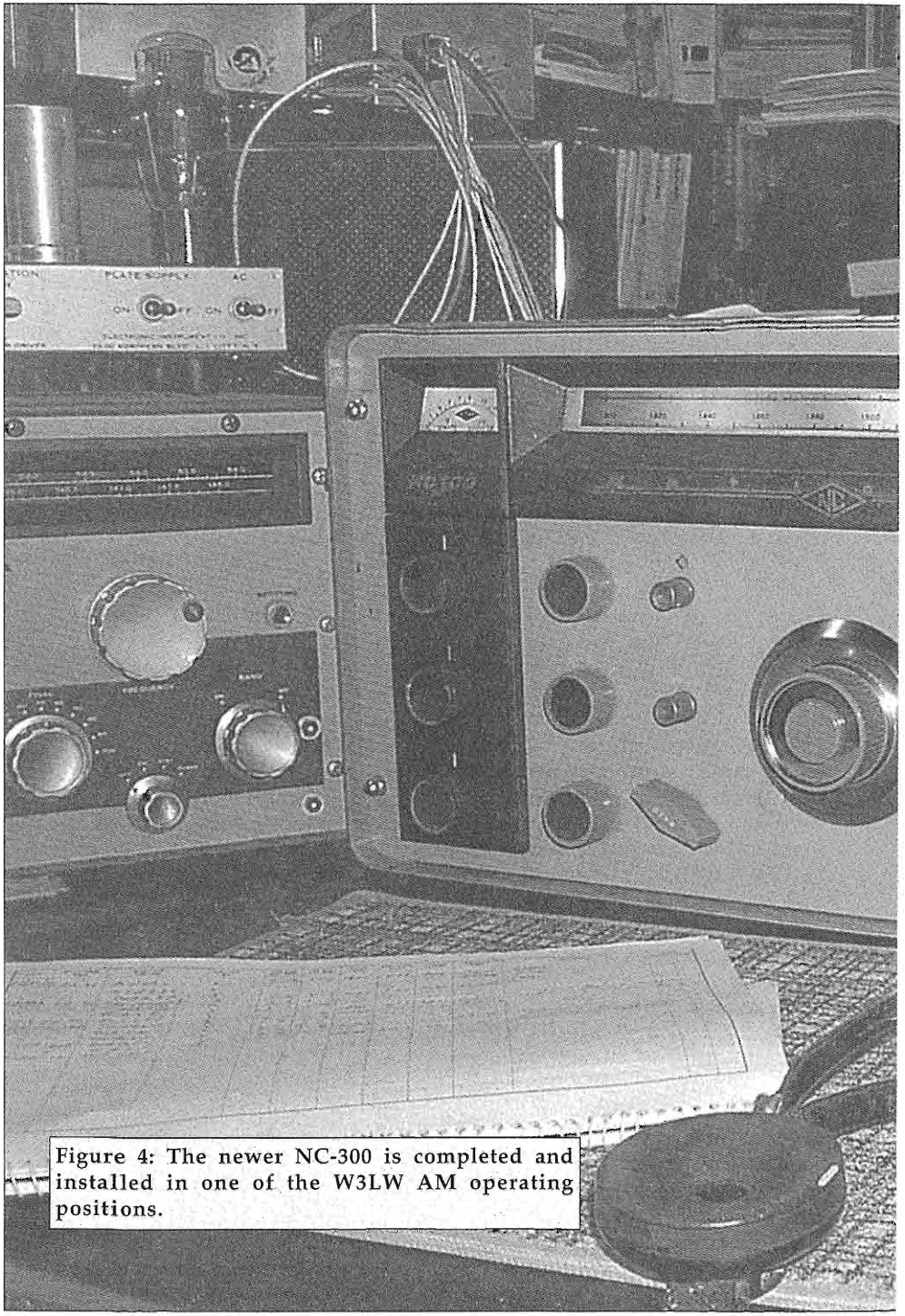
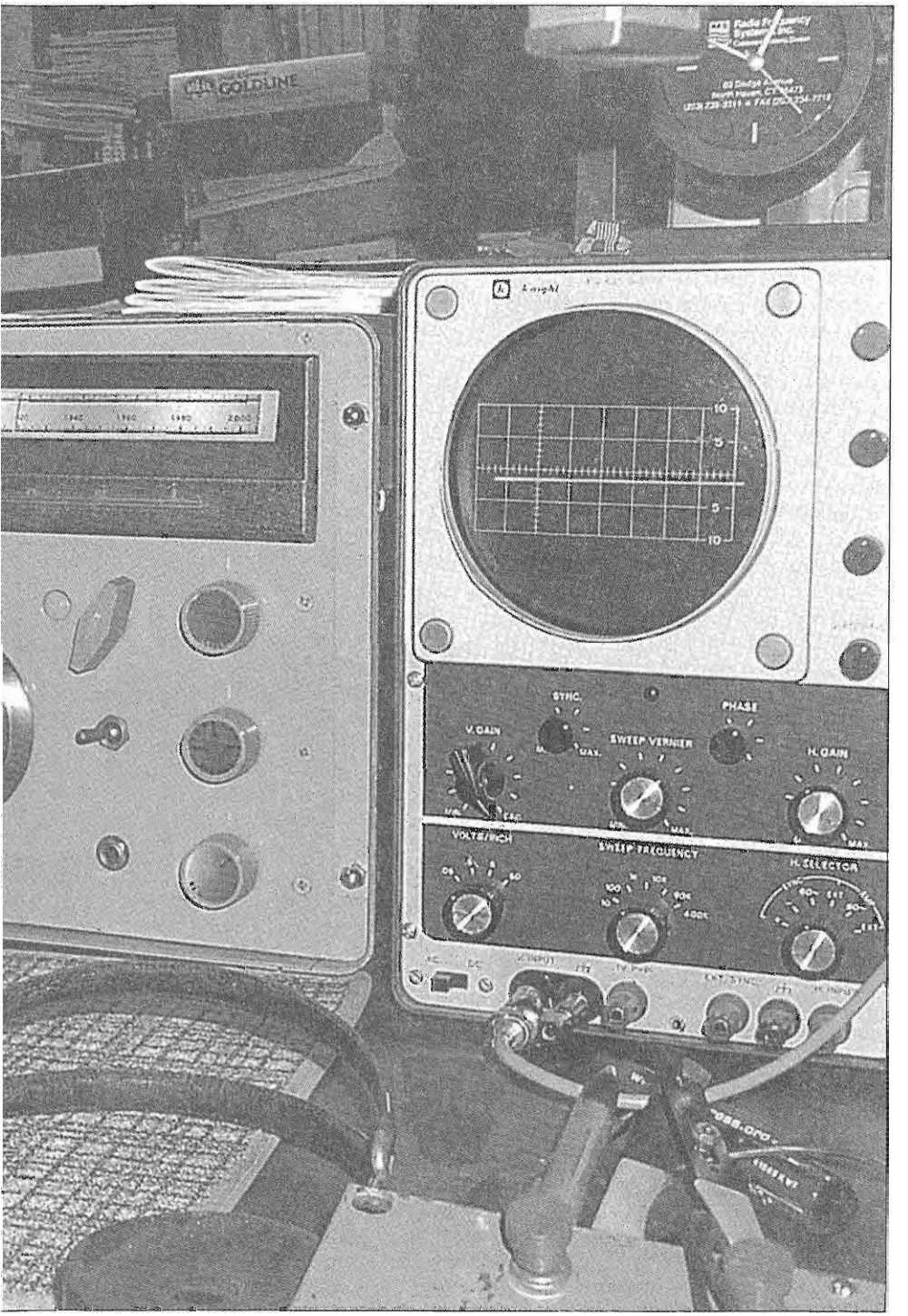


Figure 4: The newer NC-300 is completed and installed in one of the W3LW AM operating positions.


GOLDLINE
Knight
SYNC.
PHASE
V. GAIN
SWEEP VERNIER
H. GAIN
VOLTS/INCH
SWEEP FREQUENCY
H. SELECTOR

the perforated top cover to keep light from the drum assembly from shining upward.

The next step in re-assembly was to re-install the front panels. I should say here, that at this time I decided not to do a front panel and cabinet restoration. As one receiver isn't that bad cosmetically, these tasks can wait till later. I plan to experiment with silk screening and after I am confident with that process, I can tackle the front panels, which use all silk-screened labels.

The knobs were all cleaned in my ultrasonic cleaner using some Fantastic®. Some of them came up great and some were still very dull and pock marked, especially the aluminum inserts. The marking on the CWO knob is different on each receiver.

One receiver had a broken and cracked dial drum. The largest crack meanders through mainly the 49.5 to 54.5 MCS band. On K3JPB's recommendation, I used Testors® plastic cement available at my local hobby shop to glue it back together and it worked just fine. You can see the crack still because the light index of the glue doesn't match the dial drum, but at least it's together and holding.

One dial cord on one receiver was frayed so it was replaced with new cord of the proper diameter from Antique Radio. Again, the National manual shows the process. I used a piece of about #18 solid wire with a "U" bent in one end to act as a third hand in restringing these two cords. I also used some masking tape to "hold" the cords on the main tuning capacitor during stringing. While this too is a bit of trial and error, the process was helped by the use of some weights to keep tension on the lines, I was able to restring both the band change and the main tuning dial cords all OK. A thin long nosed plier was a great helper through some of the side panel access holes to get at the hooks on the dial drum itself. Prior to stringing the dial cords, remember to "load" the spring loaded gears as you re-assemble the drive mechanism. After you get the band change stringing completed, you can "slip" the band chain mechanism so that the short chain section aligns on the drive wheel correctly to align the bands centered in the dial window.

Speaking of the dial window, the older receiver had badly cracked and peeling paint on the clear Lucite® window dial protective cover that is directly behind the front escutcheon. After removing the remaining paint, I used tape to mark out the window exactly based on the good receiver cover (the opening measured 11-1/2 x 11/16 inches) and painted the rear with grey enamel to form the window. While not perfect, it looks pretty good. A better choice might have been to use grey construction paper available at the art supply store and attach to the rear of the dial window with some artist's spray mount.

Also on the old receiver, I cleaned up the power transformer and used the Permatex® Rust Treatment from the auto parts store to place a check on the rust. I painted the transformer end bells with machine grey paint. The new receiver transformer looked OK cosmetically so it was not touched. **Figure 3** shows a rear view of one of the cleaned up receivers.

HF Alignment

Once the front panel and side supports were re-installed, I worked on the HF alignment. This is actually pretty simple, but remember to put the dial pointer calibration knob in the center detent position prior to starting. The IFR generates exact frequencies to set band edges and the tracking adjustment is simply a peak in the center—or near center—of each band per the manual. The use of an operator's front panel "antenna peak" capacitor, which is really the RF stage input tuning,

makes for only one internal adjustment on the RF and mixer on each band. The 100 kcs calibration oscillator was netted against WWV on 10 MCS with my IFR service monitor in receiver mode. In spite of the receiver's age, both oscillators would still net without any circuit modifications.

National is famous for the interior coil loops that are used to trim the ceramic form coils on the oscillator section. These take a bit of trial and error to get the high and low ends of the bands "in", but with patience they eventually fall right in. I had no real problem getting the band edges to land right on the money of every band from 160 meters through 30-35 MCS on either receiver. At the end of alignment, don't forget to tune the mixer image trap as called for in the manual.

On Air Tests

All during the restoration process, I had an antenna connected to each receiver to do some casual listening and evaluation. Casual listening even on 20 meters showed that the oscillator stability was quite acceptable on SSB after a short warm up. After the complete HF alignment was completed, it was time to get serious. The radios were connected to my HF doublet and to my Tribander and all seemed well. The acid test was on the Grey Hair Net on 1945 Kcs where the newer receiver has replaced the BC-348. The performance was as expected. **Figure 4** shows the newer of the two receivers operating in the W3LW AM station.

As shown in the manual, this receiver is not a "hi-fi" design like some of the Hallicrafters units were. With a decent speaker, it is quite acceptable on AM even though the response is rolled off on both the high and low ends of the audio spectrum. Good quality amateur signals sound all OK.

ER

[...Comments, from page 1]

restructuring design calls for no changes in privileges for Extra and General class licensees on 160, 60, 30, 20, 17 or 12 meters. Novice licensees would have no access to those bands...."

I expect this proposal will be generating a great deal of controversy, especially considering the fact that the ARRL membership has repeatedly voted to retain Morse testing for HF access. I encourage everyone to fill the ER Mailbag with your comments.

BPL UPDATE

In spite of FCC Commissioner Abernathy's recent comments about the need to evaluate the reported interference BPL "might" have to licensed Amateur Radio stations, the FCC has issued a temporary radio licence to a company in Arizona to operate a BPL system at HF:

COTTONWOOD, AZ HEADS UP! - The FCC has granted Special Temporary Authorization (STA) to Electric Broadband to operate a BPL system occupying the frequency range 2 to 38 MHz. (FCC file #0506-EX-ST-2003 FX) The STA grant states, "Licensee should be aware that other stations may be licensed on these frequencies and if any interference occurs, the licensee of this authorization will be subject to immediate shut down." The point of contact at ARRL is Ed Hare, W1RFI w1rfi@arrl.org

Email Nonsense

My email service recently installed overly aggressive anti-spam software. As a result, I am not able to receive email from certain addresses. If you have sent Electric Radio an email that has not been answered, please call me on the phone. I'm NOT ignoring you!

Keep those filaments lit!
73, Ray, NØDMS

A Homebrew Sweep Generator

by Jim Hanlon, W8KGI
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If you want to work on communications receivers, you will need a signal generator that covers the IF amplifier frequency range. Most of the inexpensive, readily available, tube type RF oscillators from Heathkit, Eico, and similar sources will do this job just fine and will provide signals up to at least 30 MHz for RF alignment as well. There are a few receivers that require more than just a single-frequency source for proper IF alignment. The single conversion, 455 kc IF receivers in the Hammarlund HQ-120 series (HQ-120X, 129X, 140X, and HQ-150) require an IF sweep generator and oscilloscope for adjusting the shape of the IF passband. I can verify that simply peaking all of the IF transformer adjustments on a single-frequency source set to the crystal filter frequency, my normal procedure for all other receivers, can really foul up the IF passband shape on an HQ-129X. This article presents an easily-built, inexpensive, IF alignment generator that provides an unmodulated and AM modulated, single-frequency signal and also a swept frequency signal over the entire IF range from 41 to 1266 kHz. It will help you align everything from the low frequency IF's found in a BC-453 Q-5'er, NC-300, HQ-170 and 180, or the many dual-conversion Hallicrafters radios to the high frequency IF's in a BC-348.

The heart of this signal generator is the EXAR XR-2206 Monolithic Function Generator. You can download its data sheet at http://www.exar.com/products/XR2206.html. It is described as "a monolithic function generator integrated circuit capable of producing high quality sine, square, triangle, ramp, and pulse waveforms of high stability and accuracy. The waveforms can be both amplitude and frequency modulated by an external voltage. Frequency of operation can be selected externally over a range of 0.01 Hz to more than 1 mHz." It is also easy to acquire. Among other sources, you can buy the XR-2206CP, a 16-lead Dual Inline Package version, from Jameco Electronics for $3.59 each. Go to http://www.jameco.com, click on Integrated Circuits, then Linear Series, and Generators, and you will get to "IC, XR2206, Jameco #34972, $3.59 USD."

I first built a sweep generator with an XR-2206 chip that I bought from Radio Shack several years ago. It was a bare-bones circuit with a single IC and a few resistors and capacitors built on a piece of perf board. I supplied the needed sawtooth sweep waveform input from my Tektronix 453 oscilloscope. It worked well and allowed me to align the IF's on my HQ-129X. Since then my Tektronix 453 has died and my new scope doesn't have a sawtooth output from its time base, but it does have an "X-Y" display. Also, I lost my original signal generator. I think it's in that great mess of stuff on the shelf under my workbench somewhere, but I'll be darned if I can find it! Since I have a new HQ-129X to align, I just decided to build a new sweep generator, and this time to put it into a "project box" big enough so that I wouldn't lose it again. To match the capabilities of my new scope, this one has its own

internal sawtooth and audio sine wave generators made out of a second XR-2206 chip. I'll show you how to build the bare bones, single-chip version or the expanded version in the accompanying diagrams.

Figure 1 is the circuit of the single-chip generator. +18 V is the positive power supply terminal. It should be between 10 and 26 volts. I am using two 9-volt transistor radio batteries in series. The negative side of the power supply is connected to ground. You can get fancy like I did and put a switch on the batteries and an LED "pilot light" to remind you not to leave the power on and run down the batteries, or you can just connect them with a couple of snap-on clips if you wish. Pins 8, 9, 15, and 16 of the IC are left open. If you want only a sine wave output, you can just eliminate the switch Sl and connect the 200-ohm resistor directly between pins 13 and 14. Triangle waves are available at pin 2 with Sl open. Square wave output is available at pin 11. Triangle and square waves will contain odd order harmonics (3rd, 5th, 7th, etc.) as well as the fundamental frequency in case you need a swept signal above the frequency range that the generator can cover with sine waves. I put a 600-volt blocking capacitor on the pin 2 sinusoidal output just to keep any B+ from the receiver being serviced from damaging the IF signal generator.

Figure 2 is the circuit of the expanded, two-chip version of the signal generator. It includes a four pole, three-position rotary switch that selects between AM, Sweep, or CW (unmodulated, single-frequency) output. That switch could be the hardest thing to find in building this unit, but I used it because I had it and it made the job of changing modes of operation easier. You can make your own adaptation if you can't find a similar switch.

On the left in **Figure 2** is a low-frequency oscillator that runs from 1 to about 750 Hz. In the AM switch position, the lead between pins 13 and 14 is connected by the switch through a 200-ohm resistor, and the XR-2206 output is a sine wave suitable for AM modulation of the IF oscillator chip. In the sweep position, pins 13 and 14 are open, and the output is a triangle wave suitable for sweeping the output of the IF oscillator chip. In the CW position, the bottom section of the switch turns off the power to the low-frequency oscillator chip. The 1-megohm pot labeled "AM/Sweep Freq" controls the frequency of the low-frequency oscillator. The 33K resistor connected to pin 3 of the low-frequency oscillator sets the amplitude of its output at a level convenient for both AM modulation and for sweep. That resistor could be a 50K pot if you want to control the low frequency oscillator's output level. In the sweep mode, the 50K pot just below the "External Sweep Input" controls the sweep width from either the internal or an external source. Higher amplitude causes the IF frequency oscillator to cover a greater frequency range.

On the right in **Figure 2** is the IF oscillator. With a 500 picofarad mica capacitor between pins 5 and 6, and with the frequency determining resistors connected between pin 7 and ground, and a series combination of IK fixed, 50K "Bandset," and 500 ohms "Bandspread" as shown, the IF frequency range in my generator runs between 41 and 1266 kHz. Yours might be a little different. If you want a lower frequency range, increase the capacitor to more than 500 picofarads.

I need to say a word about the output of this generator in the AM mode. It is actually a double-sideband, suppressed carrier signal with the circuit configured as shown. To create a traditional, double-sideband AM signal with a carrier, one would have to shift the DC offset level of the signal supplied to pin 1 on the IF oscillator chip. The AM

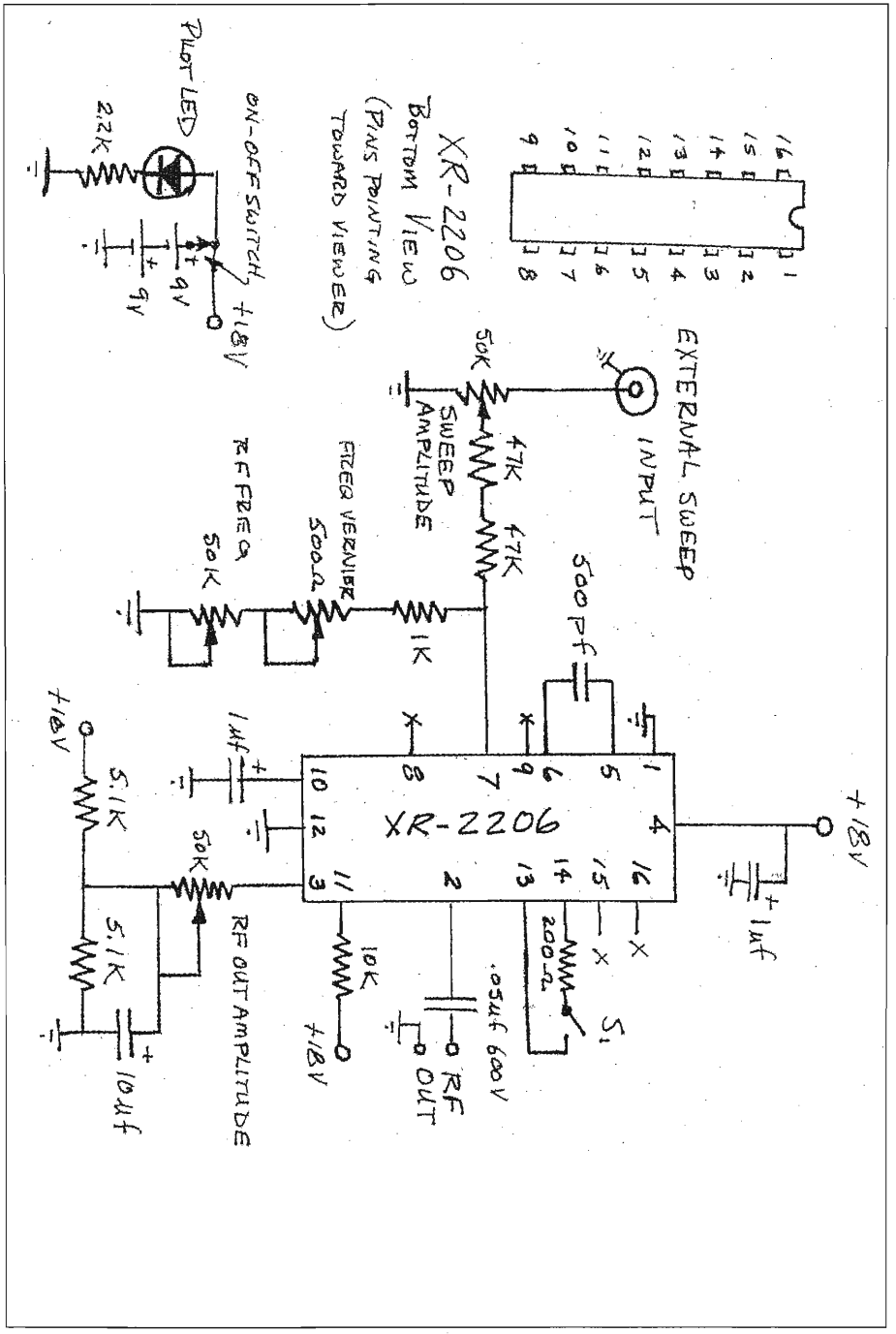

Figure 1: The single-chip sweep generator suitable for use with an oscilloscope with a sweep waveform output.

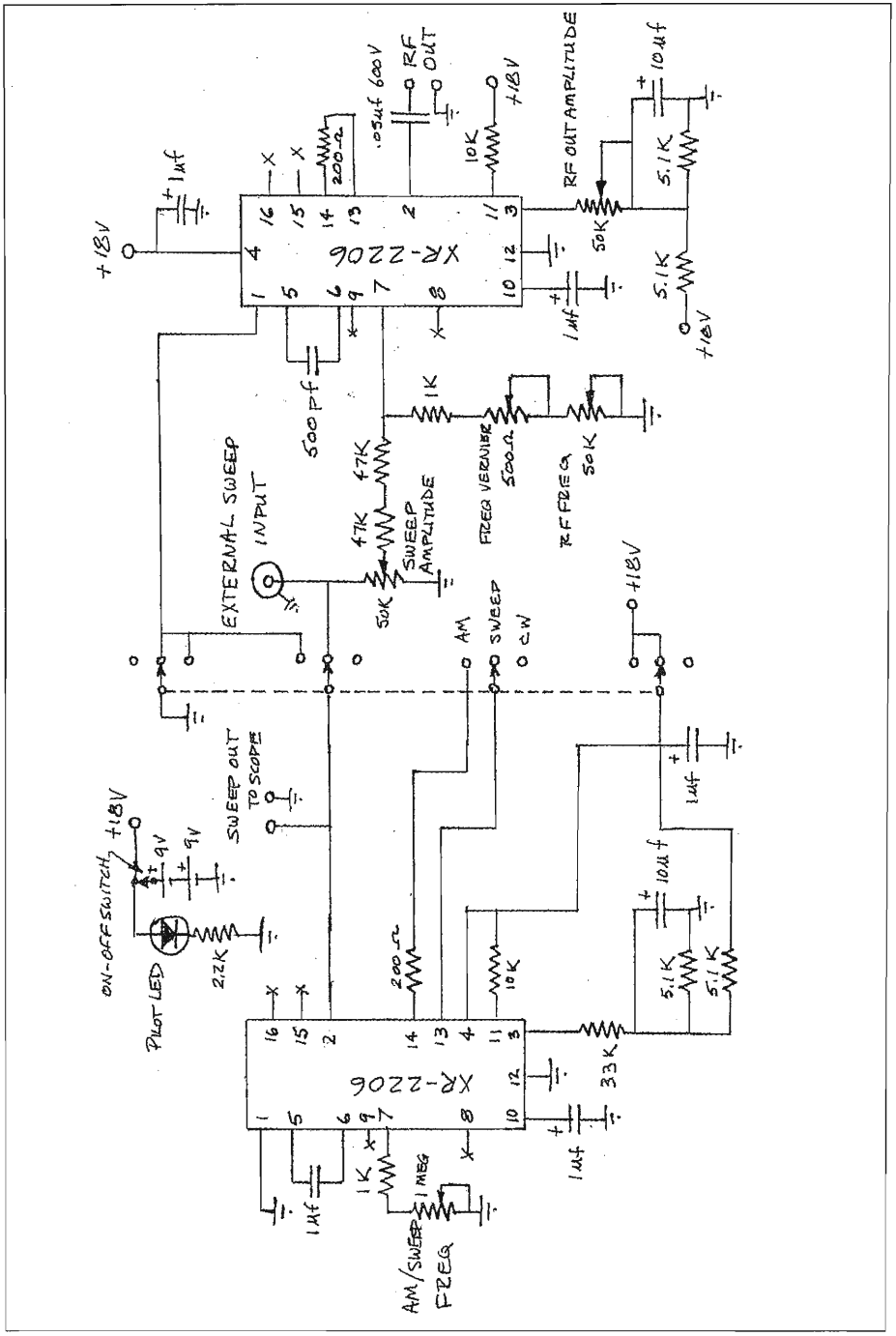

Figure 2: The two-chip generator with internal sweep and an AM modulator generator suitable for use with an oscilloscope having X-Y display capabilities.

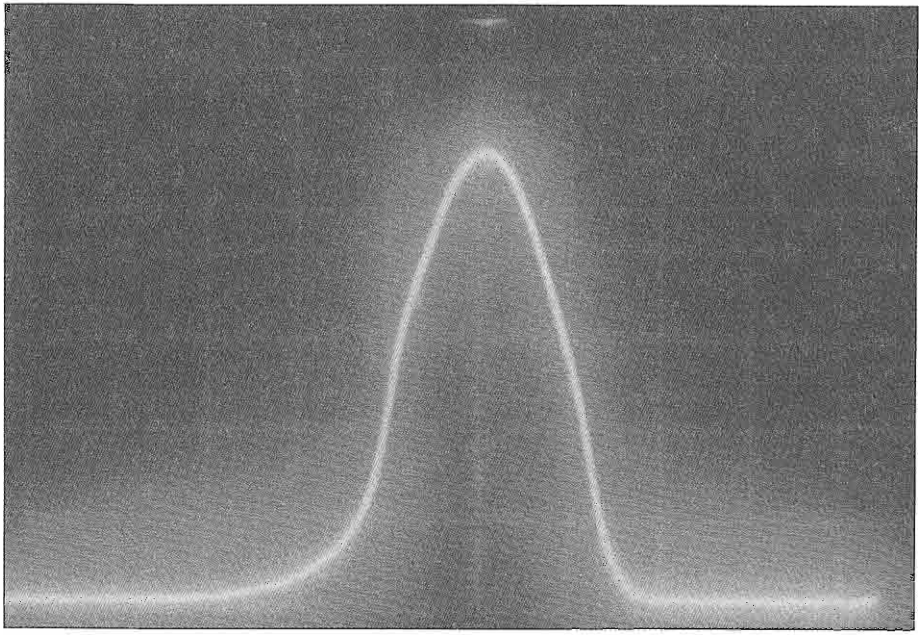

Figure 3: The IF bandpass waveform from my HQ-129X.

signal is normally used to provide audio output from a receiver for aligning its IF amplifier without having to turn on the receiver's beat frequency oscillator. The DSB-SC output from the generator serves this purpose quite nicely, with the two sidebands beating against one another, producing a "heterodyne" much like two carriers in the receiver passband did in the good old days. The audio frequency heard is twice the frequency to which the low frequency oscillator is set because of the spacing of the two sidebands, but that is of no consequence when you are using the generator in the AM mode to tune up an IF amplifier.

The controls on the schematic are all mounted on the panel of the project box. The top knob is the main, 50K "RF Frequency" pot. The 500-ohm "Frequency Vernier" pot is below that to the right. The RF "Out Amplitude" pot is below and to the left. Across the bottom row from left to right are the "Sweep Amplitude", "Mode Switch", and "AM/Sweep Frequency" controls. At the top left are output terminals that attach to pin 2 of the low frequency oscillator. This provides a triangle-wave output for the X-axis drive of an oscilloscope during sweep operations and also a sinusoidal output when the generator is set to the AM position that you can use as an audio signal generator. The BNC connector beneath these terminals is the "External Sweep Input" connection. If you decide to drive this generator from an external sweep source, just set the mode switch to CW to turn off the internal sweep. The pilot light LED is just to the left of the BNC. The "RF Output" terminals are on the upper right with the power switch just below them. The project box panel is an aluminum sheet, and I tied it to the internal ground.

To use this unit as an alignment generator, just connect the RF output to the appropriate spot in the receiver, usually the signal grid of the mixer tube or of the individual IF amplifier stages,

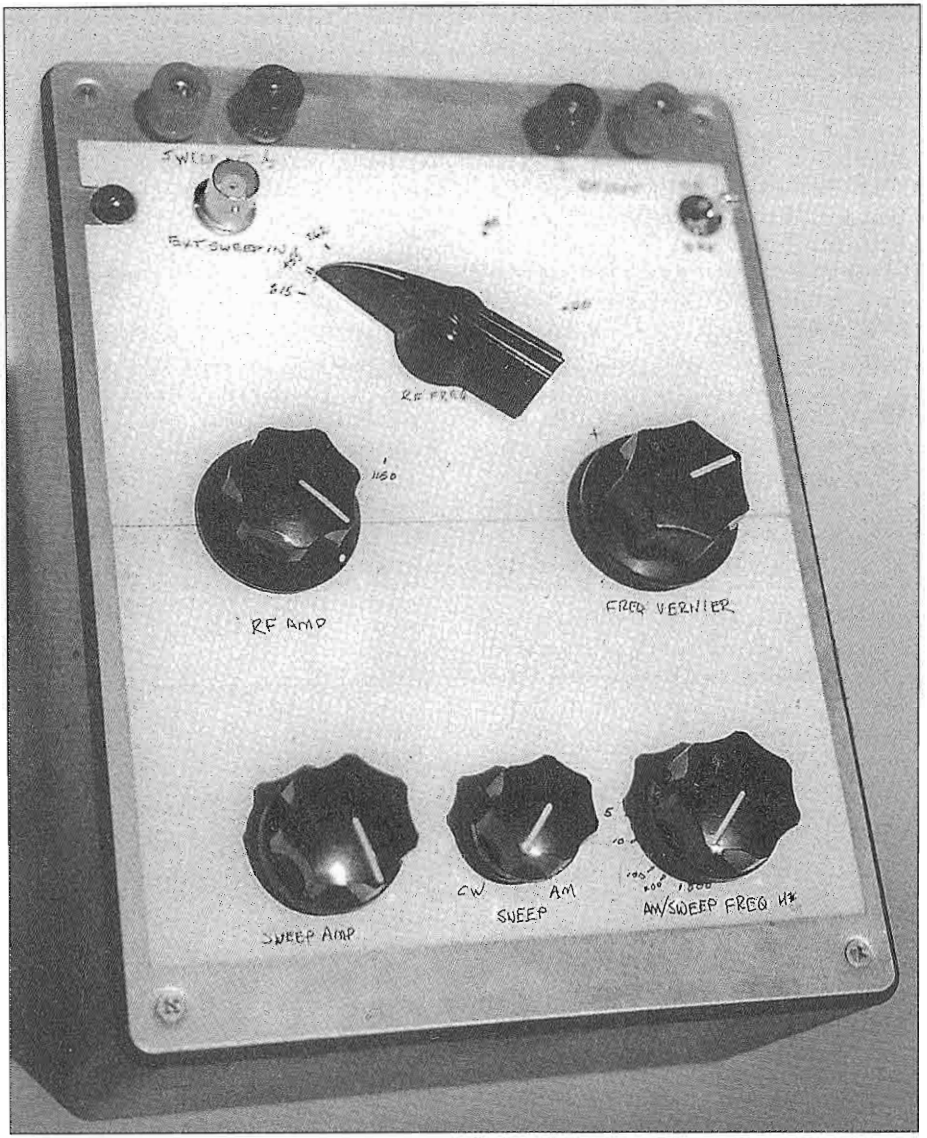

Figure 4: The two-chip sweep generator assembled in its project box.

and to ground, of course. You can find recommended alignment techniques using the AM or CW outputs in my ER article on servicing receivers[1]. I used the generator recently in CW mode to align the 60 kHz IF in a friend's NC-303, and it was much more stable than my General Radio audio oscillator, and easier to set to the proper frequency as well because of the Frequency Vernier control.

To do a sweep alignment you will need to connect an oscilloscope directly across the diode detector output. I find that I need to connect my scope probe directly to the diode cathode, pin 8 of

the 6H6 detector in my HQ-129X, rather than beyond the audio coupling capacitor that feeds the audio gain control in order to get an undistorted picture of the IF bandpass. I use the DC coupling option on my scope input to avoid low frequency distortion. It also doesn't work to connect the scope probe to the top of the last IF transformer, because the extra capacitance of the probe detunes the transformer. Adjust the RF Frequency to the frequency of the receiver IF, at which point you will see a deflection on the oscilloscope. Adjust the sweep frequency (the low frequency oscillator frequency or the oscilloscope time base driving the External Sweep Input) down until the scope trace shows no distortion as the sweep runs across the IF bandpass. The response will be distorted, generally skewed to the right as the frequency sweeps up and to the left as it sweeps down, if the sweep frequency is too high. I find that I have to run at about the lowest available sweep frequency when I'm aligning something as selective as the HQ-129X IF amplifier string to avoid excessive distortion. Adjust the Sweep Amplitude so that the full IF bandpass is displayed across the scope sweep and adjust the Frequency Vernier control so that the center of the bandpass is in the center of the trace. Adjust the RF Amplitude so that the peak of the waveform is not driven into saturation or flattening. You may need to turn down the receiver's "RF Gain" or "Sensitivity" control too if the output from the sweep generator is still a bit too much. (The "RF Gain" pot normally controls IF gain on receivers like the HQ-129X as well.) If the receiver has a crystal filter, switch it in with the receiver's "Phasing" control centered and note the point on the sweep where its response occurs. You will want to center the IF alignment about that point. And finally, adjust the IF transformers for a symmetric bandpass around the crystal frequency with maximum response. **Figure 3** shows the trace that I achieved when aligning my HQ-129X

For those of you who are concerned about such things, I will apologize for throwing together an alignment generator out of solid-state parts to use on my tube-type, boatanchor receivers. But when you can find an IC like the XR-2206 so ideally suited to the purpose and for such a bargain price, it really doesn't make sense to fool with anything else. So please forgive me, and have a good time aligning your receiver's IF's.

References:

1 - ER # 142, 143 and 144, March, April and May 2001, "How to Repair a Receiver, Part 1,2 and 3." (IF alignment is covered in Part 3)

ER

A complete on-line searchable index to the entire run of Electric Radio Magazine may be found at this URL:

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The HBSR-2: Homebrew Superhet Receiver 2 Part 2

by Brett Gazdzinski, N2DTS
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Since the first home brew superhet works quite well, I thought I would try building one with what I learned on the first one, and 7 and 9 pin tubes in place of the octal tubes used in receiver #1. [ER #176]

From the first receiver, I learned that I did not need any RF amplifier. The antenna can be connected directly to the mixer through a tuned circuit, and will provide all the gain that can be used. This method makes a very low noise receiver.

I also learned to use air wound coils for the L.O., because it was much more stable than slug-tuned hand wound coils.

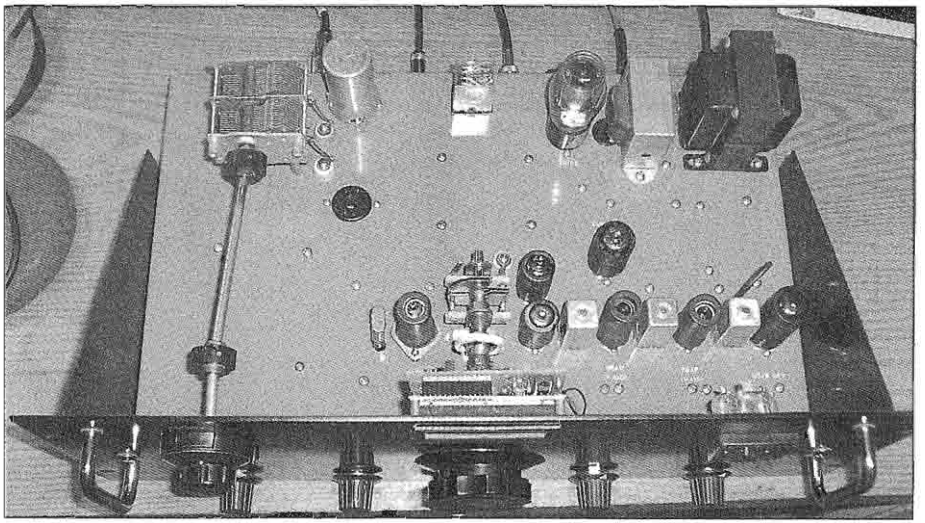
Another thing I learned is to place things close together, and don't leave lots of space between tubes and IF transformers.

Capacitors in the L.O. should be NPO or silver mica, but NPOs are better.

The diagram does not show the complete Kiwa filter board I used that has two filters on it. It hooks up the same way.

Performance of the new receiver is very good overall and similar to the first version. It has less warm up drift, and settles down quickly to become totally stable.

I did not include 160 meters on receiver number 2, as I never go down



The is the top view of my second receiver that uses all miniature tubes. The input peaking capacitor is at top left, the power supply at top right, and the VFO tuning capacitor is in the lower center.

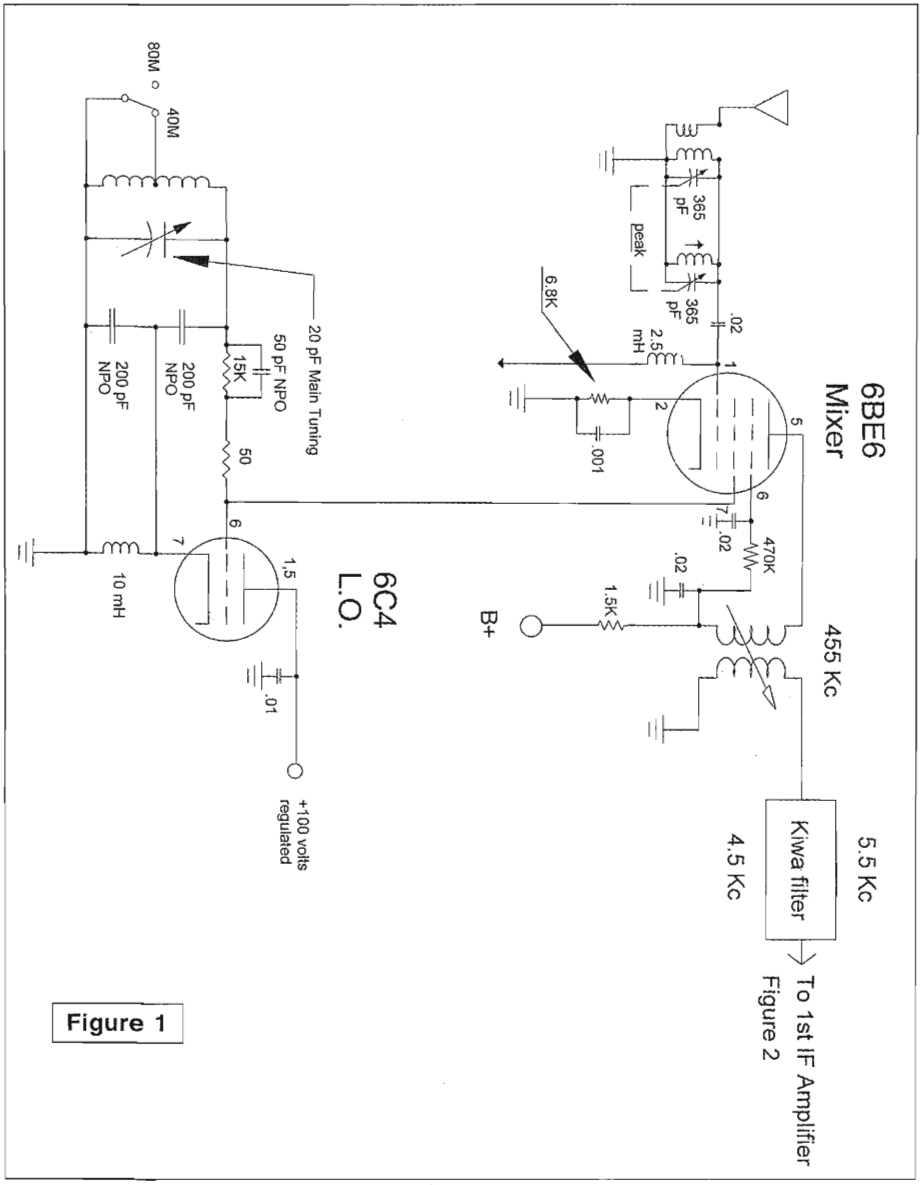


Figure 1

Figure 1: The diagram above shows the direct-fed mixer, the 6C4 local oscillator, and the Kiwa filter module.

Figure 2, Page 19, opposite: The signal flow continues at the Kiwa filter output. The two 6BA6 IF amplifiers feed a 6BJ8 Detector-AGC stage. There is no audio power amplifier in this receiver because I use an external audio stage that has low distortion and high fidelity.

there. Plus, I don't have enough room for a good antenna.

The L.O. operates from approximately 4100-4500 kHz on 80 meters, and 7500-7800 kHz on 40 meters. It is 455 kHz higher than the receive frequency.

The L.O. coil and switch are mounted in a small box to isolate the coil from RF fields and temperature changes.

I included a small variable cap that is wired so that another switch section puts it in-circuit on 40 meters. I can set the receiver to be in the AM window, and then when I change bands between 80 and 40 meters it automatically goes from 3880 to 7290! The adjustable cap makes the setup easy.

The L.O. is very tolerant of changes in values; you can use a wide selection of coil types and sizes, more or less tuning capacitance etc.

The receiver seems to work great on 40 meters; I think you could push it higher with good results.

A BFO is included, but no product detector, as I don't listen to SSB much, and use the BFO to zero beat AM signals. SSB does sound good on the receiver, but takes playing with the gain control on the BFO to match various signal strengths.

IF amp circuit values can be changed to raise or lower gain, the cathode resistors have a big effect, and the screen resistors do also.

As you can see, each stage is simple and easy, and can be checked as you go. Some playing with values may help peak things. Many antenna input circuits may be used, air wound coils, slug tuned forms, single circuit or two, etc.

I can detect no problems with interference, out of band trash, birdies, etc.

Many tubes can be used as IF amps, I tried 6BZ6 tubes first, and then switched to the 6BA6. The 6BZ6 gave me trouble with feedback, which I could likely have fixed with circuit value

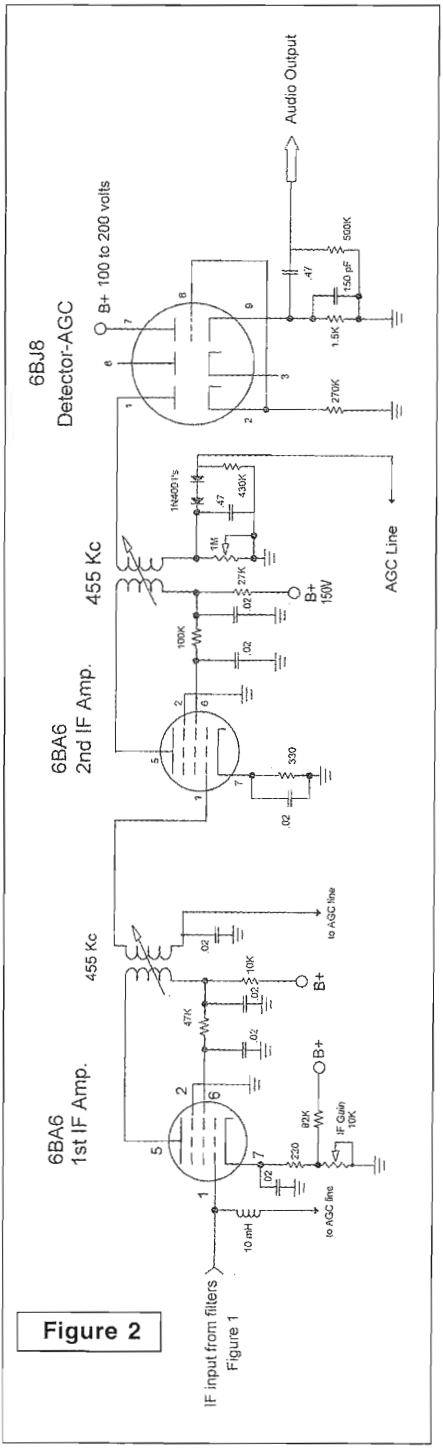


Figure 2

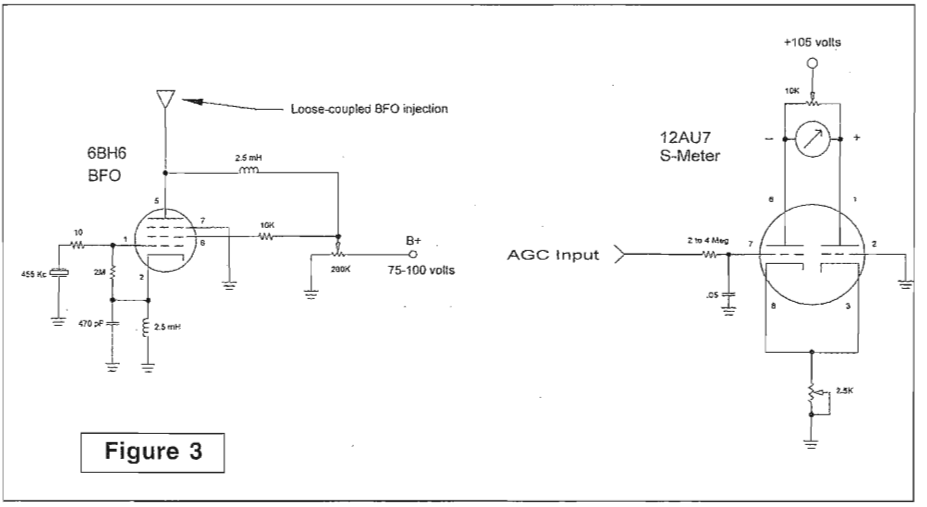


Figure 3: The 6BH6 BFO stage is to the left. It is not physically wired into the IF stages, but instead radiates a signal with a short wire lead. The 12AU7 S-meter is to the right.

changes (cathode resistor value), but tried the 6BA6 and stayed with it.

Once the metal work was done, the receiver went together quickly. It then took about 2 weeks to build and work some bugs out. The AGC circuit took some fooling with to get right.

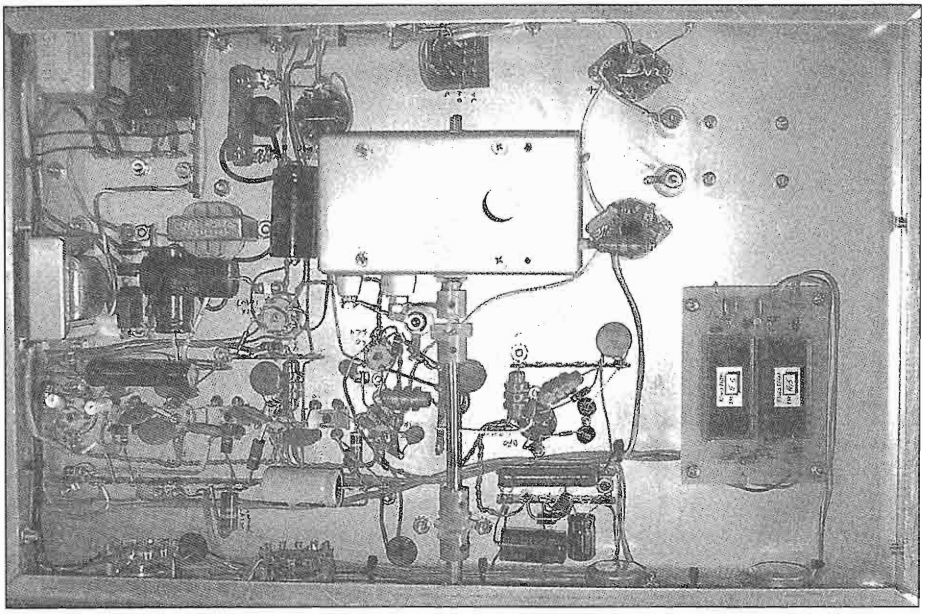
Using the homebrew receivers is very gratifying, the fidelity is fantastic, noise is incredibly low, and tuning is stable, easy, and smooth.

The digital readout (almost all digital electronics) allows very good accuracy. No direct connection to the L.O. is needed for the digital display; it picks up enough signal for a good readout by soldering the pickup wire onto an unused L.O. tube socket pin. It's basically a freq counter with an adjustable offset, you set it to subtract 455 kHz to get the receive frequency readout. You could use a regular dial if you are good at marking frequencies on it.

I used a Heathkit S-meter that is backlit by three ultra bright red LEDs, which gives a nice touch.

Anyone who wants more info can contact me.

[Kiwa filter modules were reviewed in ER #84, April 1996. As of this writing, they are still available from Kiwa Electronics, 503 7th Ave. NE, Kasson, MN 55944. Their phone number is 507-634-6134, and email is kiwa@wolfenet.com. Kiwa has a web site at www.kiwa.com, but they are not currently set up for secure on-line orders. It is best to call them for credit card orders, or mail your payment in with a check or money order. Kiwa currently has a line of individual 455 kc filters in the LFH series, which are intended to be used for replacements of Murata 455 kc ceramic filters. These are less than $30.00. They also have Standard Filter Modules in 10 different bandwidths at 455 kc. These were reviewed in ER and are $50.00 each plus shipping. They make a Filter Module Switch Board to provide switching between two bandwidths, priced at $36.00. A recent addition is the Kiwa Premium Filter Module that has improved performance. They are claimed to have much lower noise, and over 100 dB of ultimate rejection. They have 6 to 8 dB of insertion loss, compared to



This view underneath the main chassis shows the parts layout in my second receiver. The Kiwa filter module is at the lower right in this photo, and the two bandwidths are marked on the filter cases. The VFO tank coil is inside the shield at the upper center, with a flexible coupling and a panel shaft extension running to the front panel. The 6C4 LO socket is located just below the coil compartment and just to the left of the flex coupling.

almost no loss with the Standard Module. These new modules have not been reviewed in Electric Radio, and current pricing is $75.00. All of the Kiwa filter modules offer affordable selectivity for homebrew designs, and are very easy to apply and get going.

The Kiwa web site can provide a full glossary of filter terms and plotted response curves for their products. They make it very easy to apply their filters in any application.

For builders who need the next step up from ceramic filter designs, high performance 455 kc crystal filters for experimenters are available from International Radio, land-line phone 541-459-5623, 13620 Tyee Road, Umpqua, OR 97486. They make a wide variety of bandwidths, but are three times the cost of Kiwa Standard Modules. They also will require impedance matching at the input and output ports. The INRAD web site has on-line performance curves made with lab-quality instrumentation.

Dave Curry's Collins mechanical filters are available through the ER bookstore, and can be easily fit into homebrew designs.--Ed.]

ER

O.G. Villard, Jr. W6QYT, SK

by Ludwell Sibley, KB2EVN
102 McDonough Rd
Gold Hill, OR 97525-9626

Oswald Garrison ("Mike") Villard died January 7 at the age of 87. The amateur-radio community has good reason to take notice of the passing of this pioneer, who brought to life several technical developments that we almost take for granted today.

Born in 1916, he was licensed in 1930 as W1DMV. He graduated from Yale University, then moved to Stanford for an Engineer degree in EE.

Graduating in 1943, he went to war work at the Radio Research Laboratory at Harvard under Frederick Terman, the renowned radio engineer. RRL was the "countermeasures" lab comparable to the radar-development group at the Radiation Laboratory at MIT, and Villard worked on such projects as the AN/APT-2 "Carpet" airborne jammer and the use of "chaff" (half-wave foil strips dropped from aircraft) to blank out the displays on enemy ground radars. Returning to Stanford in 1946, he obtained a Ph. D. degree in 1949.

He served on the Stanford faculty until about 1970, then moved to SRI International. His callsign in California was W6QYT.

The greatest impact of Villard's activities on amateur radio was demonstrating the feasibility and benefits of SSB-SC (suppressed-carrier) transmission. This he did via tests at W6YX, the campus club station.

The first QSOs were in 1947, on 20 and 75 meters. They drew strong editorial interest from QST in 1948, starting the swing to SSB. Villard kept the momentum going by a series of articles in QST and Electronics.

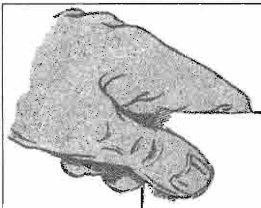
W6QYT did not invent SSB. AT&T had it in commercial use on wire lines in 1917 (in the Type A four-channel carrier system, Washington to Pittsburgh - only 11 years after the invention of the triode vacuum tube). Jointly with the British Post Office, AT&T had SSB in transatlantic service in 1927. Nor was Villard the first amateur user of SSB - as reported earlier in Electric Radio, there had been magazine articles as early as 1933 and some experimental use in the '30s. His contribution was to catalyze the postwar resurgence and final success of this modulation method. The result was the abandonment of AM in military and commercial use, and its widespread use on the Ham bands.

One of the reasons advanced for the continuing existence of amateur radio is that it yields technical knowledge. No one shows this better than Villard and W6YX. Before the SSB tests, he had used the station to demonstrate high-frequency echoes from meteor trails, the subject of his doctoral thesis. The cover photo from QST for March 1952 shows a lovely photo of a 360 degree PPI (plan position indicator) display of ionospheric backscatter signals during a band opening on 20 meters. These were the result of sending a string of "dots" (pulses) from W6YX and receiving the returned signals from thousand-mile distances as the beam antenna rotated continuously.

Dr. Villard enjoyed a career of professional research: detailed studies of the meteor-echo phenomenon, detection of missile launches by backscatter, over-the-horizon radar generally, and

[Continued on page 24...]

Mailbag



To:
Electric Radio
PO Box 242
Bailey, CO
80421

Dear ER:

Numbers Alone are Misleading! Receiver evaluation, as expressed by statistics of the current crop of digital wonder toys, occurs under pristine laboratory conditions. High quality low noise sources supply specific frequencies, specific products thereof are carefully measured...Life in the Ether, however, is some orders of magnitude more complex.

Signals that appear side by side on a spectrum analyzer display are, to a certain extent, stacked on top of each other when processed simultaneously in broad band circuitry. Look at the 6mc SWL band at night on an analyzer connected to a resonant antenna. What you'll see is a forest of signals, many of them measured in 10's of millivolts at 50 ohms. Stack all those up and you're going to need something on the order of an 813 not to clip once in a while. This would make the receiver cumbersome. The solution is to place as much passive selectivity as possible before active devices like amplifiers and mixers. Filters and active control circuitry can generate IMD also.

The R390A with 7 (8 - 32mc) to 10 (.5 – 8mc) tracking high Q tuned circuits before the first sharp filter is probably the best existing radio in this respect. The R390A also, being mechanically switched, tracked, and tuned generates no noise or distortion because of it's control functions.

Solid state amplifiers, mixers, and switches saturate or hard limit when overloaded. A tube circuit with a large grid leak resistor (1Meg), and some cathode degeneration at base band doesn't. If total input exceeds operating bias, the excess is rectified and the operating point immediately increases to include the entire signal and the device keeps on cooking. With the possible exception of a direct lightening strike, you can't kill a tube amp with a transient signal. The tuned front ends, wide dynamic range, and soft limiting of tubes make these older radios far more satisfactory for use in hostile electronic environments like Suburbia and Field Day multi sights.

Now there's the phase noise thing... Solid state Bozo's blew it...and continue to, with progressively less insight; if that's possible. But, WOW...are there a lot of buttons on those plastic front panels! 250,000 possible bandwidths! I'm going into sensory overload!!! OK, ... "Easy Big Fella"...

Phase noise, for this purpose, is: unavoidably generated side band energy (FM and PM) that is on all signals. Phase noise gives any carrier a measurable finite width in frequency. The further you look down from peak amplitude, the wider the signal becomes. High dynamic range considerations involve interacting with this wider part of an oscillator's signal.

Think of a synthesized tuning LO as looking like a Christmas tree, when what you really need is just the trunk. It's the needles and branches on a synthesized oscillator that cause the intermod problems.

As any carrier is generated at, or multiplied to a higher frequency, the noise pedestal gets wider at all points. The higher the frequency, the more phase noise on any signal. Heterodyne mixing, which is the fundamental signal processing tool used in most receiver designs, mixes desired LO frequency offset plus LO noise (phase, frequency, and amplitude) with any and all incoming signals. Each mixing step adds additional noise.

The design goal here should be to generate minimum total noise. The lowest noise way possible to generate an RF carrier is with a well done crystal oscillator. Therefore, using crystal oscillators for high frequency LO's, and placing the VFO (the noisy one) at a relatively low frequency (R390A) will give the lowest total conversion noise, and as a result, the best measured and experienced performance.

The conclusion, if we're willing to make it....With a tuned front end tube rig, IMD specs amount to a close-in, worst case when the radio is hooked up to an antenna...With the broad band solid state front ends, those IMD specs amount to an unobtainable best case, when the radio is hooked up to an antenna. The KDØZS R390A answers that nagging question in the back of your mind as you look through the ever larger and more glossy advertisements: "Are these things for real?"

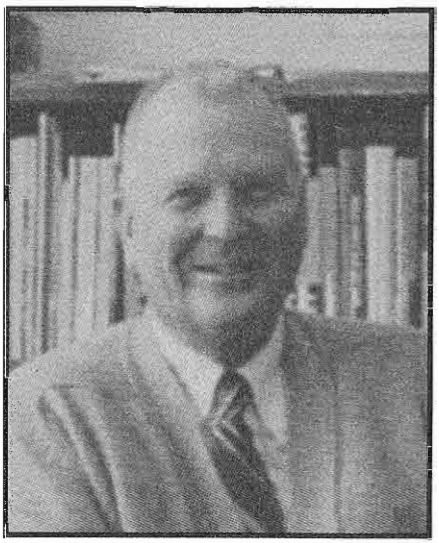
73, Chuck Felton, KDØZS

ER

[...W6QYT from page 22]

methods for cancelling radar reflections from stealth aircraft. Closer to home, he designed the Select-O-Ject, a tunable audio filter that enhanced a desired CW signal or trapped-out an interfering heterodyne. He wrote numerous times in QST on the elusive topic of long-delayed radio echoes. Late in his career he designed, for the Voice of America, a simple antijamming loop antenna that could be constructed by a radio listener overseas, capable of receiving a randomly-polarized skywave signal while rejecting local groundwave (vertically polarized) jamming. When the Tienamen Square killings took place, the instructions for making the antenna were translated into Cantonese and sent quickly to China.

Villard was a Fellow of the IEEE and of the American Academy of Arts and Sciences. He was the holder of half a dozen major professional awards based heavily on his ionosphere research.



Dr. Oswald Villard Jr. (W6QYT) in 1980.

ER

The Power Line Converter- A 5Kv Shack Substation

by Tom Marcellino, W3BYM
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Rockville, MD 20853
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This article was written to share with ER readers how I solved a commercial power line problem in my shack. The problem was the old familiar line voltage drop due to heavy current draw. A separate 120-volt line using #12 cables was installed several years ago, but pulling heavy loads such as my legal limit 813 rig dropped the line voltage from 120 to 112 volts on voice peaks! No surprise here.

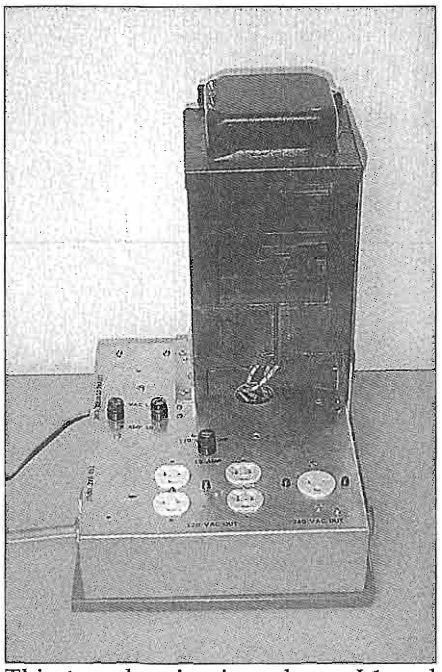
I had a saying especially when talking with anyone running a BC-610 that uses 100TH tubes. I would comment on how well my 100TH tubes were modulating on voice peaks from the 813 rig. Now, this was a good trick, seeing that I use triode connected 813s as modulators. I finally had to tell them that my shack has several room lamps that use power tubes as bases. The 100TH filaments were not in use but the incandescent bulb on top would dim on modulation peaks. This should give the reader a good measure for the amount of line voltage drop.

Admittedly, the problem could be solved by a different method such as running larger diameter cables. In my case the shack is located 60 feet from the main power panel in the house. To do the job correctly I would have chosen #6 cables with a cost of about $75. If you have peeked at the photos or schematic you know I didn't choose the cable method. Now, some would say that I'm tight fisted. I like to say that I'm just plain cheap. Besides what interest would there be in an article featuring #6 cable and rafters?

Besides the separate 120-volt line, I have a 240-volt line for the SB-240 amplifier in the shack. So, my thinking was directed toward using the 240 line. This is when a very tired looking and heavy transformer came into the picture. Thanks to Mike (WN3B), who donated the iron for this project, the problem was ultimately solved.

The transformer was located in Mike's iron stock in Brookville, PA. Its final resting place is now Rockville, MD. Who knows how many miles this transformer had logged before Mike latched onto it, but it logged another 800 or so getting from PA to MD. The highway mileage from Brookville to Rockville is only 300.

Let me explain. As the story goes, Glen (N4VL) in Galax, VA had a Gates transmitter for Mike to pick up. I decided to help Mike and his sidekick Frank (WC3E) load up the Gates. So, on a bright Monday morning I set out from Rockville to Galax, which is about a 300-mile one-way trip. Mike and Frank set out from Brookville to Galax, or about a 500-mile one-way trip. I asked Mike to bring the transformer with him, as this would save shipping cost. At this time the gasoline prices were much less then they are today. Looking back at this situation, even with the lower gasoline prices I bet the shipping cost would have been less. But all had a great time and that's what



This top chassis view shows L1 and L2 beside the 240v outlet. L3 is between the pair of 120v outlets. The standard 120v output fuse and holder were changed per the text.

this hobby is all about to me.

The transformer is commercial grade with a 2:1 ratio and had several coats of worn paint. Someone had used bright orange and green and even black during the course of its life. I was going to leave it that way but since ER hasn't gone with color photos yet, I ended up painting it black. The transformer is estimated at 5Kv based on the lead-out wire size being #12 and its weight of 50 pounds with dimensions of 5"x6"x12". This transformer has no tag identifying its manufacturer or model number but companies like Acme, Triad, Square D, and others currently produce them. I've recently seen transformers that are suitable for this project on Internet auction sites ranging in price from $25 to $50. Or you may find one from a friend with an infinite iron pile.

Commercial transformers, like the one I used, have small metal tags fixed to the lead out wires. The tags are identified as H1, H2, H3, H4 (primary) and X1, X2, X3, X4 (secondary). For this project, the windings were connected in parallel to support maximum current draw. Both sides of the 240-volt primary are fused at 10 amperes and the 120-volt secondary is fused at 15 amperes. As the secondary comes from the transformer it is floating, so I picked one side and grounded it to the chassis. Prior to start of construction, the transformer was Hi-Pot tested to 1000 volts. Not knowing where this piece of iron had been stored this was a good idea.

The project was constructed using a 10"x12"x2" aluminum chassis with a steel bottom plate. The finished product appears top heavy in the photo but once on the floor and tucked out of the way, the 50 pounds of iron keeps everything stable. All internal wiring uses #12 stranded wire with 600-volt insulation. The control relay is rated for 25 amperes on its contacts with a 120-volt coil. Notice the large Jones terminal strip with screw terminals. This is no place to use those flimsy phenolic solder lug terminal strips. All connections used crimp-on terminals that were solder-filled after the crimp.

Under normal operating conditions, the transformer gets a little warm. This is normal even with no load draw and is due to self-heating from the windings. Often when in the shack I don't have need to energize the Power Line Converter so a control relay was installed in series with the primary. This also gave me an additional disconnect for the 240-volt feed to the amplifier. The switch that operates the control relay is located within reach from the operating chair because the Power Line Converter is on the floor out of sight and reach. Colored lamps for both the 120 and 240 lines were mounted on the chassis and readily give a visual indi-

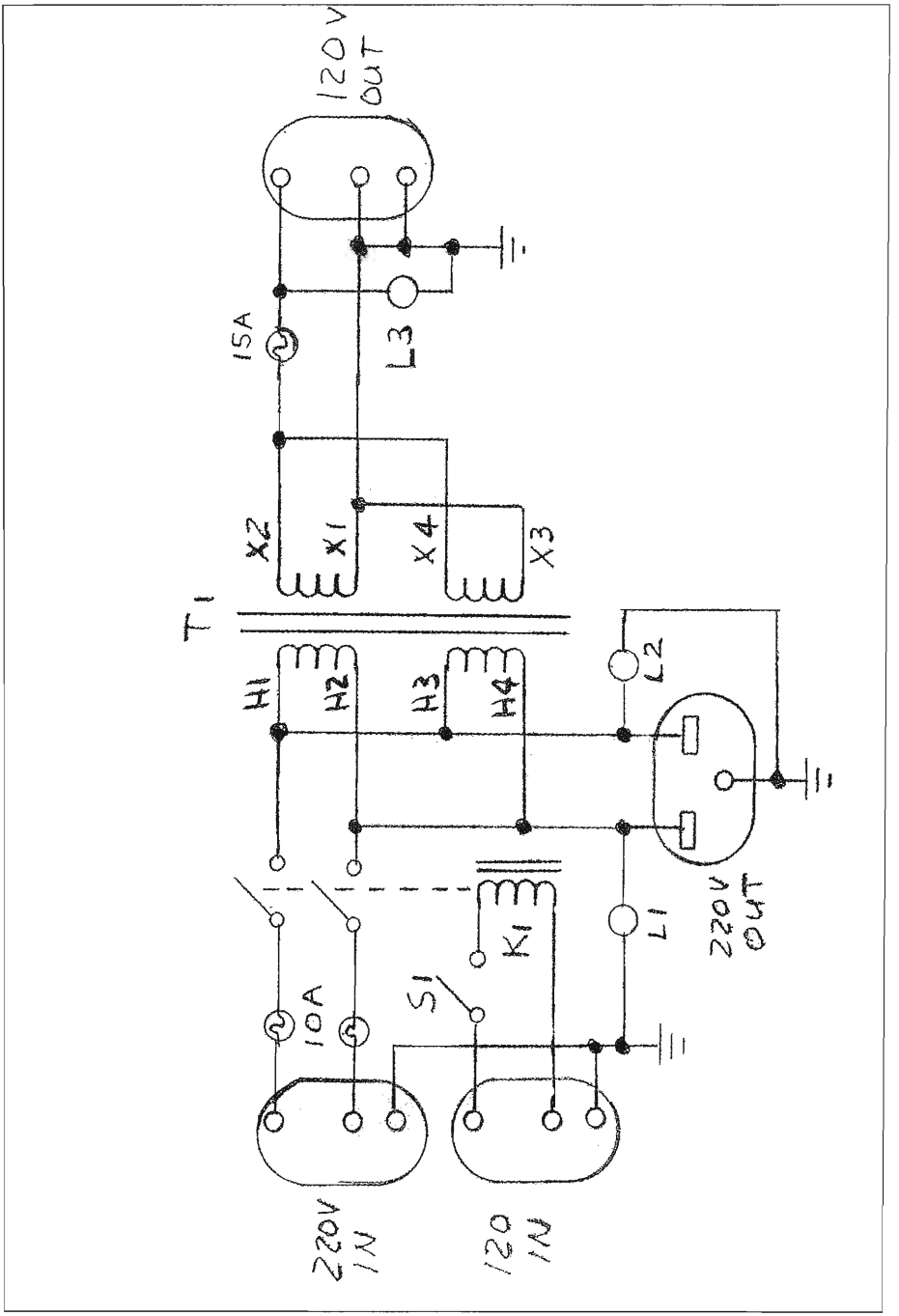
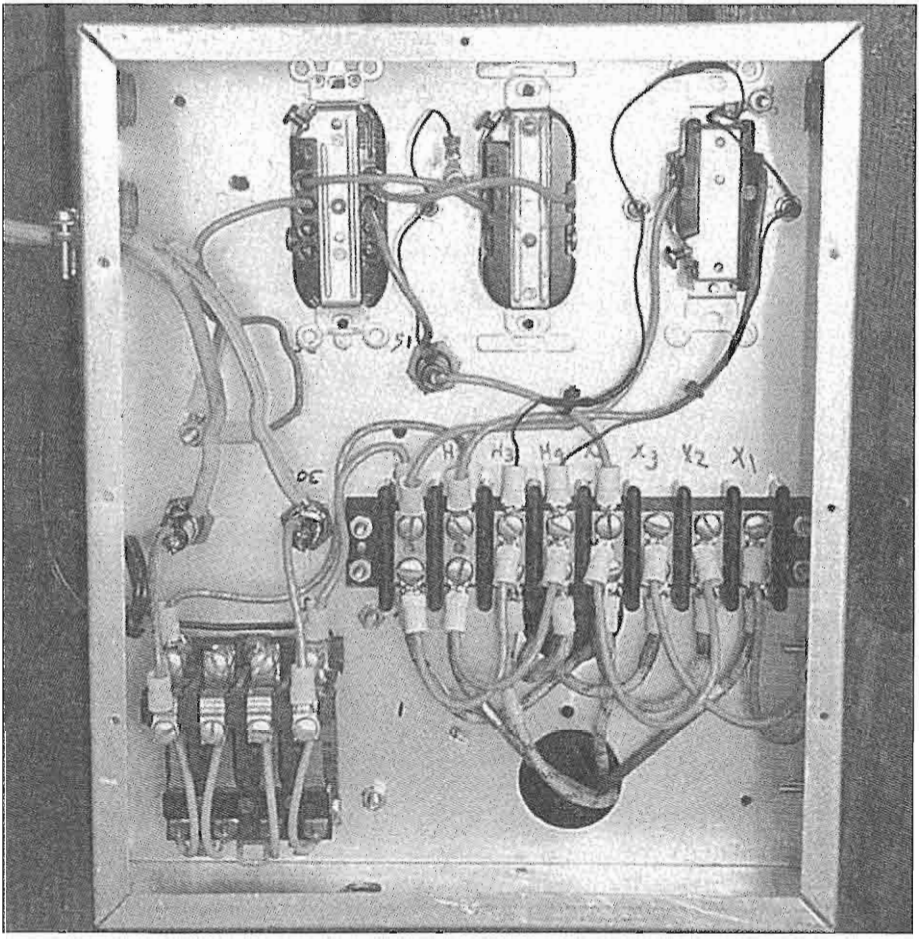


Figure 1: The control relay switch S1 should be located at the operator's desk. L1 and L2 are Radio Shack #272-712 (Red) and L3 is #272-708 (Green). [Both 220V terminals should be 240V..Ed]



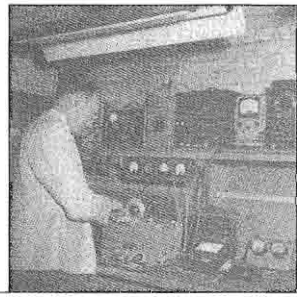
The bottom-chassis view shows the control relay in the lower right corner.

cation of the voltage status.

The Power Line Converter supplies primary voltage to three transmitters and my Kenwood 870. Gone forever are the modulating 100TH tubes. This will lessen the stress on BC-610 owners until they fine out that I still use the tubes as lamp bases. The converter has been trouble-free except for one 120-volt line fuse melt down. This happened after several months of almost daily operation using the 813 rig. I attribute the melt down, and resultant open circuit, not to a fault with the 813 rig but a mechanical issue with the fuse holder. The 15-ampere fuse rating was correct but the fuse holder was not. There was just too much resistance in the standard fuse holder that I used. The heat generated over a long period of time slowly melted back the fuse element until it eventually opened. This problem was corrected by installing a large screw type 15-ampere fuse and surface-mount holder. Oh yes I did get this idea from the screw type fuses used on the front panel of the BC-610.

ER

The Restoration Corner



Rebuilding Damaged Modulation Transformers

by Clark Hatch, WØBT
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Topeka KS 66617

A few years back I picked up a free transformer that was left on a street curb. I took it home, cleaned it up, and discovered that it was a modulation transformer with a screen tap, and would be perfect for a triode-connected 813 modulation deck I was planning.

The transformer was baked at 150 degrees in an oven for about a day and afterwards checked OK with an ohmmeter. On the bench, I brought the voltage up slowly with a Variac, but when it reached the full voltage I wanted to use with my 813's it shorted out. At this point I threw the transformer behind my storage shed and gave up on it.

Checking with several transformer rebuilders, I found out that new or rewound mod transformers are very expensive, about one dollar per watt. This was when I decided to salvage the burned-out transformer and restore it.

This was a steel-cased transformer that was potted in road tar--typical of many old transformers. It went back into the oven for 3 or 4 hours at 200 degrees. Using welding gloves, I removed the transformer from the oven and chiseled off the rivets on top that held the case together. Because the tar was still hot, the core slid right out of the case. Then, a pocket knife was used to remove as much old tar as possible.

I still had to remove the remaining tar, and the transformer varnish on the core laminations. Deciding the easiest way to do this would be to burn it off, I got a 3 gallon steel bucket and put the core inside, and filled with a gallon of Kerosene. *CAUTION: DO NOT USE GASOLINE!* Kerosene burns slow, and is not explosive like gasoline. What I got when the burn was over was a bucket of black carbon powder. The varnish, tar, and all of the old paper spacers were gone, and the laminations came apart easily.

The laminations were cleaned up with soap,, water, and a stiff brush to remove soot and remaining grime. When they were dry, I sprayed both sides of them with Rustoleum Spar Varnish. Don't use a thin varnish like Krylon. The completed laminations are shown in **Figure 1**.

I needed to know how many turns per layer of wire the old transformer used. I weighed the old wire, and used a copper wire table to calculate the

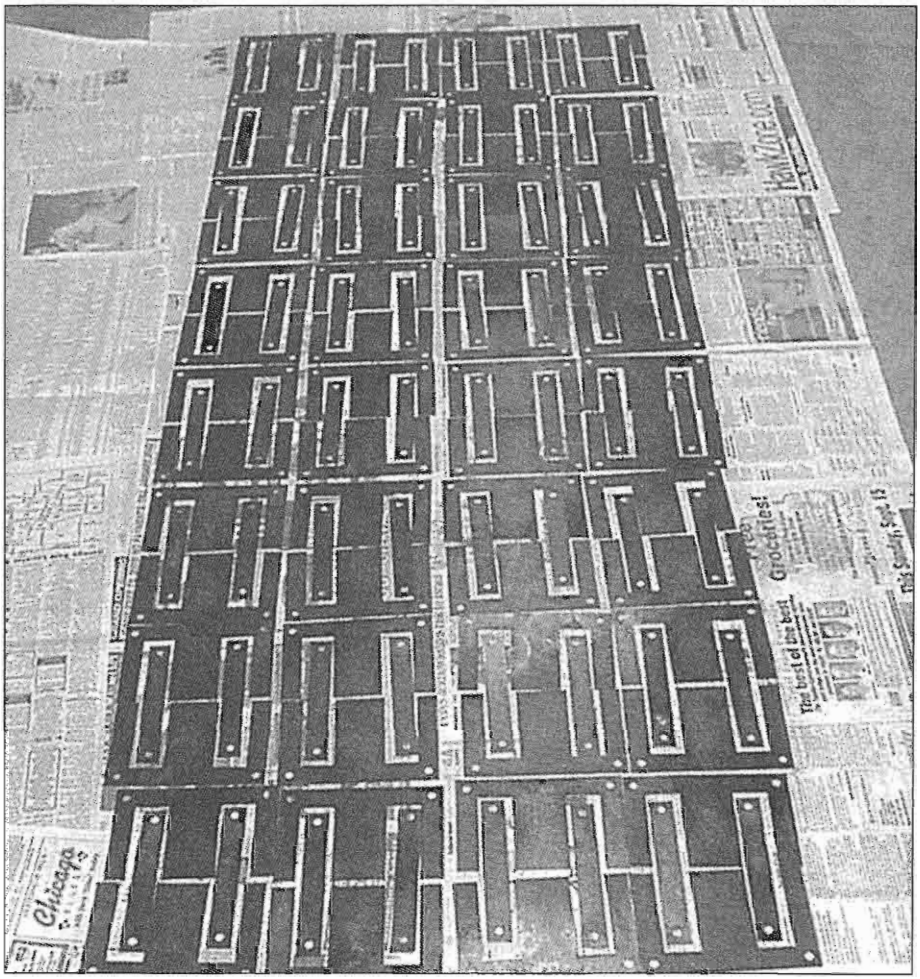


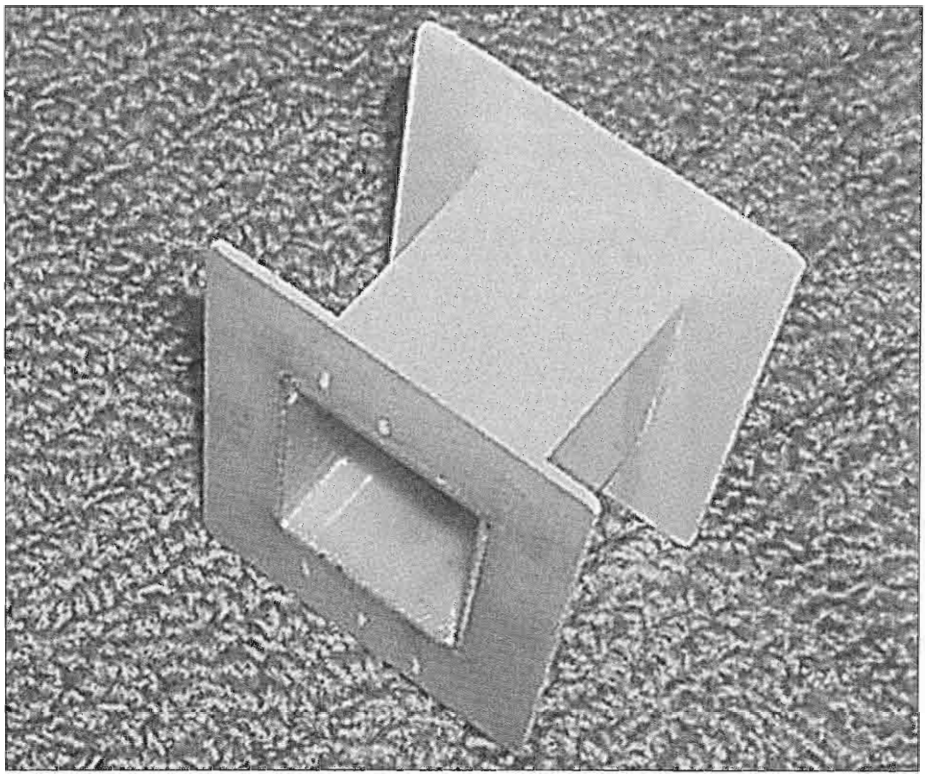
Figure 1: Here are the transformer laminations after having been coated with the spar varnish. They have been set aside on old newspapers to dry. Don't use anything besides the spar varnish because it will not provide enough electrical insulation.

original length. Knowing the total original length, I got an idea of the original number of turns. I'll go into information on audio transformer design in a future article.

If you do choose to have a bad transformer rewound, it may be cheaper if you send them the transformer already out of the case and with the tar removed.

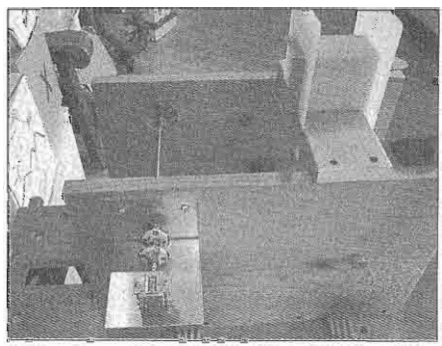
I built a transformer winder out of scrap pieces in my shop. The details are shown in the photos on the next two pages. The dimensions are not at all critical. All that it needs to do is hold the bobbin securely and count the number of turns accurately.

On page 33 are photos of the completed transformer, and the completed modulator deck.

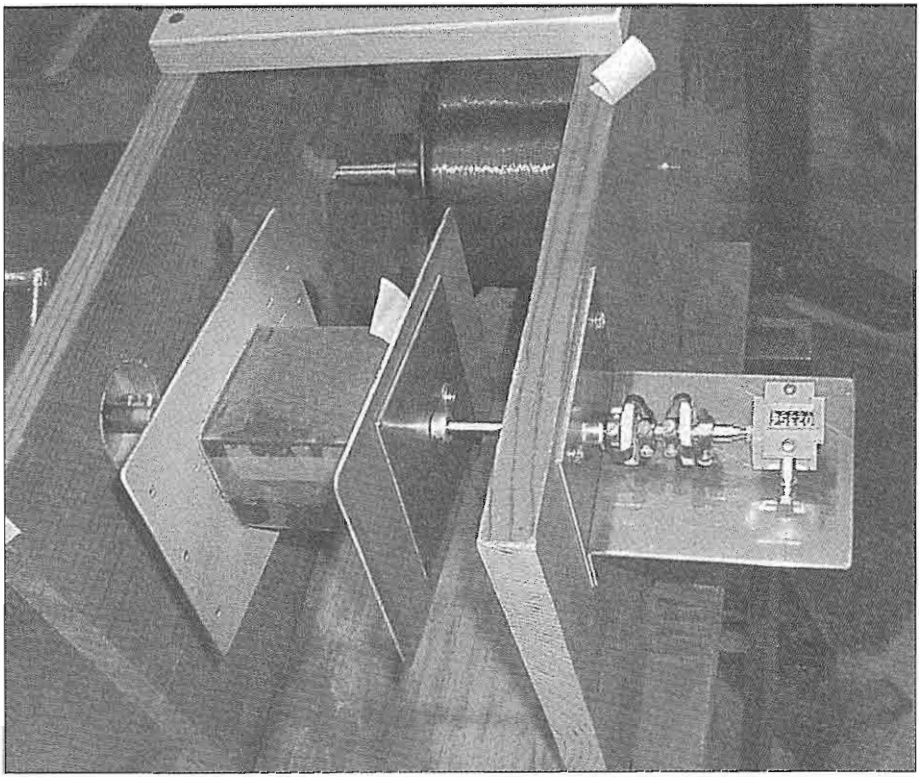


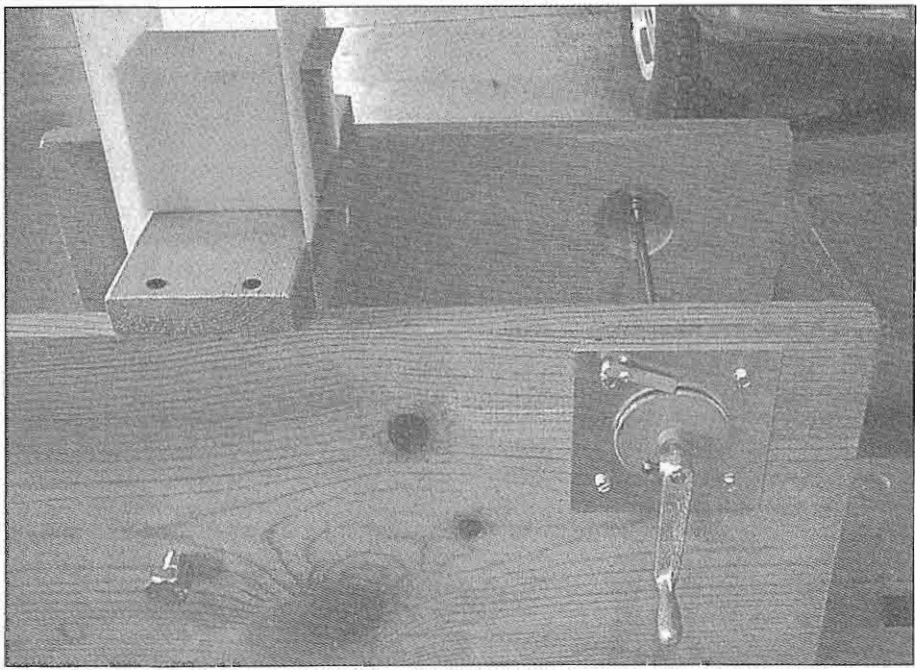
Next, a bobbin was fabricated to hold the new winding. This was made from FR-11 glass-epoxy circuit board that was cut to size to fit the laminations. Super glue from the hardware store was used to assemble the pieces, and the finished bobbin turned out better than I thought it would be--very strong and easy to wind the new wire onto.

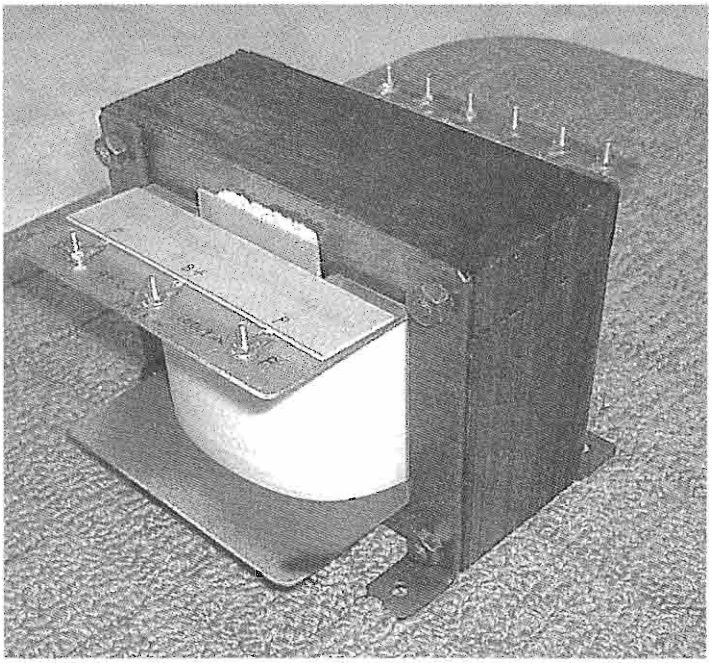
A coil winder was made from scrap pieces around my shop, and it is shown in the small photo to the right, and in the two large photos on page 31. The small photo on this page shows the turns counter and the metal bracket that holds it. The lower photo on page 32 shows the winding crank and a ratchet stop I made. Try to find a non-resettable turns counter with a full shaft, not the style that is advanced with a cam. You may need to back up on your count, and the cam style will loose the count. This is especially critical when the transformer has a center tap. The photo at the top shows the bobbin ready for winding. The spool of magnet wire is



at the rear, and the bobbin is held in place with metal plates that are fastened to the winding shaft.

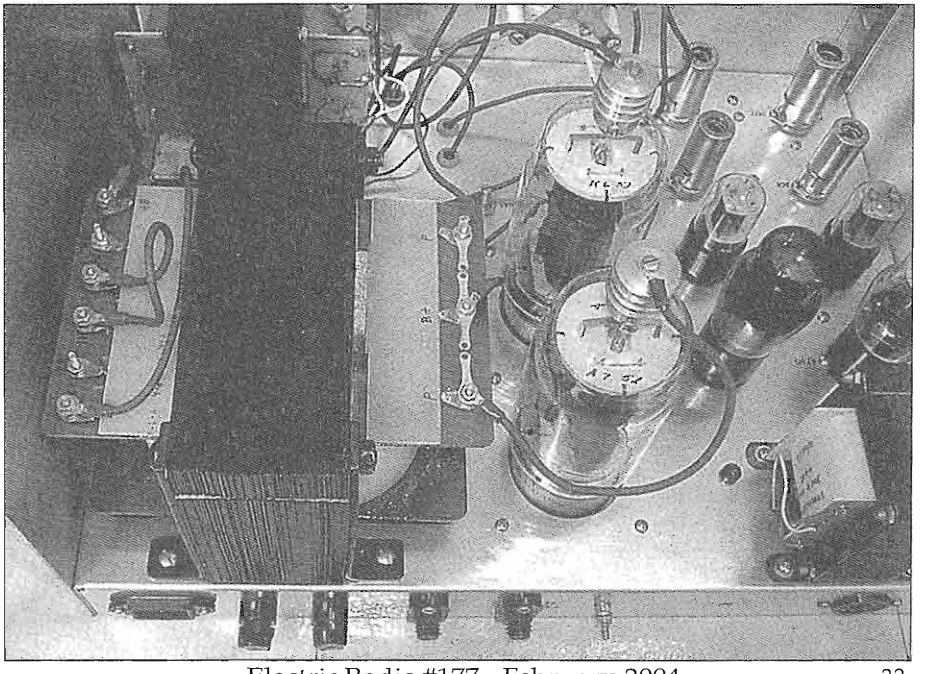






The restored transformer is in the photo above, and below is my finished modulator deck. The triode-connected 813's are running full rated voltage with no problems, and the mod transformer was essentially free for the taking.

ER



Installment 8

W. J. Halligan
Newspaper Reporter and the State of Radio
1923-1924, Part 4
Broadcast Listeners (BCLs)

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Full Outline of Part 4:
Broadcast Listeners

A. Citizens Who Mainly Listen
- Listening Styles
- DX Hounds
- Night Owls
- DX Records
- Proselytizing Converts
- Crystal Sets vs. Vacuum Tube Receivers

B. Listeners Who Tinker
- Obstacles
- Bill Halligan's Advice
- Radio Builders—Wizards
- Radio Builders—Technicians

C. Epilogue
- How Far Have You Heard?
- The Art of Soldering
- Headsets and Loud Speakers

A. Citizens Who Mainly Listen

Listening styles

A five-apartment house at 1365 Commonwealth ave., has what appears from the street to be seven aerials on the roof. Probably a couple thrown in for good measure. Have any of the fans observed any similarly be-aerialed roofs? [3/24/23]

Radio has for some time back supplanted the victrola in the home of "Steve" Dowd at Newburn st., Jamaica Plain. "Steve" and family found out many months ago that music of all kinds is being furnished by broadcasting stations, not to mention the other radio attractions. [3/27/23]

Why risk life and limb in an attempt to place an aerial on the roof when one on the piazza [porch] works just as well? That's the logic of William Donahue of 59 Tempelton st., Dorchester. He finds that he can hear all broadcasting stations within the radius of a few hundred miles using an aerial which he has rigged up on his piazza. [3/27/23]

Some people find radio an expensive luxury. Still they like to listen in to the distant stations just as much as the financially flush do. Several clubs have solved the difficulty to the satisfaction of a number of fans. They have installed efficient receivers and have equipped them with loud speakers so that all the club members might enjoy the concerts. A pioneer in this club radio service is the Crosby club with Headquarters on Williams st., Jamaica Plain. All the long distance stations are heard at the Crosby club. [3/27/23]

Wonder how many present fans remember when during a storm eight years ago the steel tower at AMRAD was ripped from its moorings and thrown across the railroad tracks? And how many thought at that time that they'd one day be pursuing the elusive radio wave with all the avidity characteristic of the dyed-in-the-wool fan? [3/28/23]

"Tim" Dacey, well know member of the Boston curb [practice of selling over-the-counter stocks], is almost as well versed in the intricacies of radio as he is in the inner workings of the stock market. Tim's time is divided about equally between finance and his powerful receiver [3/28/23]

While Jackie Coogan was visiting in

the east, recently, his voice was phonographed by Dr. C.A. Hoxie, of the General Electric Co. On the evening of March 23 it was broadcast from Schenectady. How many fans heard it? [3/31/23]

If you see a few thousand persons lining the sidewalks on the Tremont st., side of the Common, don't be alarmed. They're listening to the radio gems which pour forth from the amplifying horn which John Shepard has thoughtfully placed on the top floor of the Shepard Stores. The mouth of the horn is aimed toward the street and the passers-by miss nothing. No one will appreciate the radio concerts any more than the regular "summer boarders" on the Common. [4/17/23]

"Broad-catchers" is the name a radio advertiser in England gives radio listeners. It might well be adopted for this class, as contrasted to broadcasters. [4/28/24]

WNAC is receiving all kinds of mail these days in connection with the new 286 meter wave, but the following takes the frosted zuzus:

"This is G. B. D., de-nouncing.

I used to sit and smile and grin.

When ever J. J. F. came in. But now, alas, so faint and thin.

I hear him almost never.

I used to get you loud and clear.

All of your program I could hear. But, Oh, my gosh, I sadly fear.

Them days is go-o-one forever."

Get J. J. F. to warble this to you on a 286 meter wave length, and see if it does not make you weep.

"I got like this trying to tune you in last evening. Up to a week ago Monday, I was a kindly and pleasant sort of person, loved by my family and well liked by a large circle of friends. But now, when I come in, the cat goes out, and my erstwhile friends cross the street when they see me. The 'cuss-words' I have used this past week would ordinarily have lasted me a year, and unless some improvement takes place very soon, I fear that my disposition will be entirely and permanently ruined." [4/30/23]

Radio is relieving the monotony of life in a lumber camp. It is bringing life, happiness and entertainment to those men and women who see nought but mills, huts, and trees. Heretofore living under such conditions has been unbearable and thousands of strong men who are needed for such work have refrained from engaging therein for the simple reason that they feared the loneliness of life in a great woods. But conditions have been changed by radio. Woodsmen no longer are isolated. In fact radio will result in the obtaining of valuable labor for lumbermen, will result in increasing production and—well, perhaps more homes.

The benefits being derived by those living in those far away camps are described interestingly in the following letter received recently by Station WLW:

"White Cliffs, Arkansas.

Crosley Manufacturing Company

Cincinnati, Ohio

Gentlemen:

"We recently installed a radio outfit here at our lumber plant, which is in the woods, miles from any town. The writer has been a resident of Cincinnati all his life and is more or less acquainted with some of the members of your organization through his connection with the 147th infantry. Last night we heard you broadcast from the studio and the Sinton hotel. You can imagine how good it sounded to someone about a thousand miles down in the woods to be able to close his eyes and experience all the pleasant sensations of being with the orchestra.

"We appreciated the broadcasting very much, and it came in fine."

Very truly yours, Simon Ross" [5/2/23]

Ralph Thomas of Brighton and his wife, two of the most active BCLs in greater Boston, in quest of new radio fields to conquer, are learning the code. Although not exactly tired of broadcast reception, its mysteries no longer

baffle them. So they seek even greater pleasure by listening in on the code practice lessons broadcast by WGI. [5/20/23]

Roland McCormick of Mather St., Dorchester, spent all last night listening to the fight returns as did many other fans. But he's doing something that many other fans are not doing and that is sticking to their sets during the summer months. [7/13/23]

George Murray, Boston newspaper photographer, is still a little upset over his inability to listen in on the fight returns the other night. It appears that business claimed George during the minutes in which Dempsey was decorating Luis' anatomy. We hear that others were disappointed on this occasion, as well. [9/17/23]

Palmer Guptill, of Saunders st., Allston, a neighbor of Mr. Kelley, is said by his friends to be the world's most considerate person. Although deeply interested in radio, he delayed in putting up his aerial because he feared that he would interfere with the Kelley family's radio concerts. But now that he knows that his aerials can be erected without causing his neighbor any great amount of annoyance, he has gone ahead. [9/21/23]

It was the first time that William Fultz of Greenville st., Roxbury, had ever listened in on a radio set. He spun one dial, then another. Then he boosted the rheostat a bit and resumed his twirling of the dials.

"What can be the trouble?" asked William, thoroughly nerved up by this time.

He gave the condenser a 30 degree twist, and as he neared the zero mark he heard a voice boom the command "Stop!"

So loud did the voice sound that William thought someone was standing behind him. But it turned out to be WGY furnishing the world with another radio drama. [9/27/23]

Joseph A. Costa, an East Boston BCL, tired of tuning in phone stations, has decided to attend a radio school, there to learn the code and later to get into the really interesting side of radio. Wish you luck, OM. [11/7/23]

DX Hounds

"Bill" Gallagher, well known property man at the Boston theatre, has installed a new radio set at his home. "Bill" can hear 'em from all parts of the country now. [3/5/23]

Local DX hounds are loud in their praise of the announcers at both WNAC and WGI. They say that other announcers, particularly in New York, run through several numbers before giving the call of the station. Which prevents the "hounds" from adding to their evening's list of calls heard. The ideal stations are more considerate, they say. [3/7/23]

Miss Marie Haley, of 54 Templeton st., Dorchester has the right idea. She believes in utilizing those "one moment pleases" that one hears from the local stations. She habitually tunes in Schenectady, Newark, and Philadelphia while waiting for WGI or WNAC to resume their programs. [3/19/23]

"Savoy-Havana band to be broadcastcast to American listeners-is the caption of a notice received at this office from the Savoy hotel, London. We'd be please to hear from any BCLs who pick up any part of the British broadcasts. [4/12/23]

Vincent Harold Gomes of Park st., Dorchester, is a real DX hound. His friends say that it's not at all unusual for Vincent to remain at the switch until 4 or 5 in the morning. He always shows a good log, regardless of static or other things that make for poor receiving conditions. [8/15/23]

Bert Ford, Boston's best-liked journalist, stands high on the roster of radio fandom. Using a three-tube set, Bert is able to pick up about every station in country. He recently installed a 65 foot steel tower on which he now has suspended his antenna. The tower is set in a heavy concrete block, as are the guy posts. [9/13/23]

Capt. Burr Leyson, whose aeronautical antics Bostonians have many times watched with baited breath, is one of our most active radio fans. By use of a simple arrangement of plugs and switches, he is enabled to bring in almost any station he desires. Capt. Leyson is at present attached to the East Boston airport. He may be seen almost any day soaring above the city in a Bristol bullet plane. [9/21/23]

G. Etough of Watertown is going out for BCL DX honors. With but one detector tube he had heard Chicago, Cleveland, Louisville and many other stations during the summer. Says he will make and hold the best DX record this winter of any member of the Commonwealth Radio association. How about that, the rest of you DX hounds. [10/3/23]

Hugo Bagnulo, radio expert of the Federal building, is all set for a winter of DX. At his station in Medford he has rigged up the set he had such success with last year. [10/12/23]

Fred Boudoin, of Allston, is proudly sporting a card he received from Cuba. He acknowledged a concert he heard from the Cuban station and the card is a check on his reception. [10/20/23]

The radio bug knows no favorites as is shown by its latest victim, Atty. Gen. Jay R. Benton. Mr. Benton is the proud possessor of a three tube set, but he'd be even prouder of the set if he could hear Cuba. But he has hopes for each night he succeeds in hearing a station farther south than on the preceding night. Last night, for example, he heard South Carolina. Next week he will probably hear Savannah, and who knows but that the following week will bring him the long sought Cuban station [1/10/24]

Arthur Shaw, of Columbia rd., Dorchester, with three other fans in his district, reports that Montreal is coming in louder than ever before. Two of these fans are hearing the Canadian station for the first time since they entered the radio game several years ago. [1/15/24]

Harold Hall, Boston newspaper man, reports excellent reception with his three tube set. He has heard, during the months he has been interested in radio, all the leading broadcasting stations of the country. On one occasion he heard church programs broadcast from Los Angeles.[1/17/24]

John Costello and Edward Devens, the two conductors, who run the night cars to Dorchester, are both strong radio fans. During their wait in the early morning at Park st. they each try to out do the other in telling of long distance signals they received the night before. [2/6/24]

"Bill" Hardy, secretary in the office of the state auditor, has recently purchased a three tube set of which he is mightily proud. He reports hearing stations from all parts of the country. [3/15/24]

Nearly 1000 fans listened in for two steady hours, on WJAX, Cleveland, recently to report the two-hour program and participate in the contest for three best reports. Entries came in from as far as Winthrop, Maine, and Garrochales, Porto Rico. [4/2/24]

The London, Eng., owner of a one-tube receiving set with an indoor aerial of only 20 feet reports he heard KDKA, Pittsburgh, recently. His set was originally built for local broadcast reception, he says. [4/25/24]

Australia is brought within a flash of a second to the United States, by means of radio. It is not uncommon nowadays to transmit to that faraway continent and hear its calls here. Several such instances have been reported. [4/28/24]

Night Owls

"Bill" Flynn of Charlestown is another candidate for the All-American "Night Owl" Club. He persists in staying up till the wee small hours, thus causing his parents to be greatly chagrined. But this all night application to his radio is not without its results. He's

been getting most of the long distance broadcasting stations in the country, including some of those on the Pacific coast. [3/14/23]

Several queries have come in concerning the All-American Night Owl club. "What are its advantages?" one fellow asks. We'll leave that for some "Night Owl" to answer. Just why do fans stay up all night? [3/19/23]

Another Templeton st. contribution. William Sproules has been mentioned by one of his friends as a bona fide member of the "Night Owl" club. He own a tube set on which he hears most of the long distance stations. [3/23/23]

James Ryan, of 10 Adams st., Roxbury, announced his intention of joining the All American Night Owls club. James figures that there's no sense in going to bed at midnight, after the local stations are through broadcasting, because the stations out near the Pacific are just beginning. If the sun were to rise in the west, thus putting time behind that of the Californians, there wouldn't be a single "Night Owl" in the state, or so says "Bill" Coady. [4/2/23]

Dan Savage of 66 Edwin st., Dorchester, is a regular stay-up-all-night since he got his two-stage set working. Though he was a rabid fan when he had only a crystal set he had no real reason for staying up late in view of the limited receiving range of sets of that type. But now that he can reach out, they say he never goes to bed. [7/25/23]

Charles Danker of Sawyer ave., Dorchester, is said by his friends to be one of the world's worst night owls. They say that instead of going on the air after supper, like the ordinary fan, Charles waits until midnight before he begins to comb the ether with his three-tube set. [9/27/23]

DX Records

Guy Hylan of Spalding Hill, Ashmont, had up to a few weeks ago, heard only the usual nearby stations. Then he added a freak coil to his tube set, a coil of his own construction. Now he hears everything that's in the air. An example of his remarkable reception is that he consistently hears Vancouver, B. C., which is said to be a record for this district. [3/19/23]

Who can beat this. Fred LeGrice, of Hallet, st., Neponset has received Philadelphia, Newark, Springfield and the local stations on many different occasions. "That's nothing remarkable," you say. No it isn't a bit more than the average owner of almost any type tube set is doing. But Fred's accomplishment is in the fact that he heard all these stations on a crystal set. Now, who can beat that? [3/19/23]

Walter Fandell of 17 Larkin st, Roxbury, reports that he has several times heard German stations with his set. We have no description of Walter's set, but we assume that he means that he has heard the long wave stations like Nauen, on the code press schedules. If, however, he has heard German phone stations, he has indeed established a record, for we have heard of no one to date who has heard any of the European stations, although they are broadcasting daily—or nightly.

If any other fans are hearing European stations, we'd be glad to hear from them. Several fans, owning high-powered receivers have vainly tried to hear some of the British stations but have given it up as a bad job. Experts have said that reception from Britain on radio phone sets using short waves is practically impossible. This in no way reflects on British transmitting apparatus, which is as good, and some cases better than that which American stations are using. There are two specific reasons why the British stations cannot be heard in this country, according to a well-known expert. These are the differences in time and interference. As pointed out by this expert: "Two things have been definitely established in the last 20 years of experimental radio research. They are: that long distance reception is far better in

winter than in summer, and that greater distance can be covered at night than during the day. The first is due to static conditions and the second is believed to be caused by the ionizing effect of the sun's rays. [3/30/23]

Cornelius Hourihan of 75 Yeoman st., Roxbury, says there's no kick in radio unless you build your own set. He's done just that, and judging by his enthusiasm, etc., he's getting beaucoup kick. So far as we've been able to learn, he hasn't broken any records for reception, but he's having his fun, and that's all he's after. [4/2/23]

Friends of Bill Carroll of 95 Bunker Hill st., Charlestown, are curious to know whether Bill is really able to hear Palm Beach on his crystal set as he would have them believe. This is how it comes about: The boys will be gathered around the "corner" when Bill will remark, "Well, I guess I'll go up and hear what's going on down at Palm Beach." In view of the marvelous strides radio has taken during the past few year's, Bill's friends have prepared themselves for anything. [4/10/23]

Steve Dowd, of Newburn, st., Jamaica Plain, of whom mention was made in these columns some weeks ago, is now the proud possessor of a tube set. He met with such remarkable success with his crystal outfit that he decided to "reach out" a bit. To date he's "reached out" as far as Denver, which is considered somewhat a record for a single tube. [4/11/23]

Radio programs broadcast from Scotland and England were heard by A. P. Combs, Enid, Okla., and M.B. Norman, Eureka Center, Wis. according to reports to Chicago radio offices today. Both men, using three tube receiving sets, are believed to have established a long distance receiving record. [12/29/23]

Proselytizing Converts

Life's little embarrassments. "Joe" Slocum, old Boston newspaper man, and now representative of the New York Times at Harvard, is a proud possessor of a crystal set. Feeling particularly magnanimous and philanthropic the other night, he invited a group of Harvard students up to his room, that they, too, might enjoy the benefits of science's greatest contribution to humanity. To make a long story short, they came they saw, but they didn't hear, because "Joe" couldn't seem to get the blamed set to work. {[3/19/23]

Michael C. Bellusci, interpreter at East Boston Court, entertains his friends in a truly up-to-date manner. Mr. Bellusci can tune in on Havana almost any old time, and he has things so arranged at his station that a dozen or more persons may listen to the music of this and other distant stations. [3/22/23]

Arthur Silva and Maurice Kirby, both of East Boston are doing their little bit to spread the gospel of radio among the residents of that district. They have installed an efficient three tube set in the Grand Army hall on Meridian st., where all may come and hear. Scores have been initiated into the mysteries of radio through the good offices of the Messrs. Silva and Kirby. [3/28/23]

The U.S. Navy during the war recruited some of her best radio men from the ranks of the wire telegraphers. Dan McDonald of Everett, a telegrapher in Boston, is seriously considering entrance into the radio field. He is arranging the purchase of a high powered receiver, and there is every indication that he'll be a valuable addition to the radio fraternity. [3/28/23]

U.S. Deputy Marshall James Fraser, hero of many raids on the "hangouts" of law violators and who led the raiding party of marshals and customs men on the alleged headquarters of a $1,000,000 ring of rum runners says he's going to install a radio set just as soon as has time in which to do the thing justice. He wants to put up a good one, if he puts up any, he says [3/31/23]

Harold Hogan, federal building employee, is "salting his jack" in great style. Some of his friends thought for a

while that he was saving up to get married, so great was his thrift. But the secret's out now. Harold was seen gazing longingly into the show window of a downtown radio dealer. Then followed the confession, in which Harold informed the wide world that only a few iron men now remain between him and one of the "niftiest" sets in this part of the country. [4/16/23]

There is a church in El Cajon, Cal., which has come to the conclusion that radio is the great thing of the day. The church, therefore, has installed a complete radio outfit in the tower room and has invited those who are interested in the use and development of radio to join a class for instruction. A licensed operator is in charge. [4/20/23]

A dozen or more new enthusiasts were won over to radio after a "fight return" party held at the home of Jacob Smidt of Allston. The ringside reports were so much like the real thing that each and every one of Mr. Smidt's guests declared that he would equip himself with a radio set before the end of the month. [5/20/23]

Stanley Bako of 89 Washington st., Cambridge, is all set for the Dempsey-Firpo fight. He has turned his loud speaker toward the street so that all who pass may know just how the fight is going. [9/12/23]

Jim McDonald of Marion st., Charlestown, has completed arrangements for a fight returns party at his house tomorrow evening. It is expected that a goodly gathering will be there, as Jim is said by his friends to have one of the most powerful radio sets in town. [9/15/23]

Bill Jones has been appointed official radio expert of the West Newton fire fighters. Concerts are received from many parts of the United States on a set which is under Bill's charge. Guests, including wandering newspapermen, are also called in to enjoy the concerts. [9/17/23]

Crystal Sets VS. Tube Receivers

Friends of Henry Delaney of Stratton st., Brighton, are responsible for this one. It seems that Henry bought himself a $150. set and at the same time bought a $3. crystal set for his five-year-old son, Bob. To date the boy is getting better results than the father. [3/8/23]

John J. Gann, of Forrest st., Watertown, says his crystal set is doing far better work than that of his friend next door who is operating a double tube set. [3/12/23]

John H. Mulvenny of Roslindale maintains that there's no doubt but that business can be combined with pleasure, providing the "combiner" goes about it in the right way. At his place of business, 68 Call st., Jamaica Plain, he has installed a three-tube set on which he hears all that's worth hearing. He listens in between sales, or so his friends say. [4/11/23]

Another exponent of the crystal type of receiver is Ralph Bullard of 10 Forest Hills st., Jamaica Plain. He not a record maker, or anything of the kind. Just a booster, so far as we've been able to learn. [4/11/23]

Daniel McIntyre of 12 Melville, Dorchester, is another fan who possesses a high radio batting average. There is hardly station in the country that he hasn't heard at some time or other. Of course, the fact that he has a three-tube set makes much of this reception possible, but we know any number of fans with similar sets who haven't been able to reach much further than Schenectady. There's a whole lot in the operator of the set, a fact that many fans seem to overlook. [5/4/23]

The radio bug has found another victim in Leo Taffe, Boston newspaperman man. Leo announces that he is about to join the army of BCLs through the modest agency of a crystal set. He is a bit perplexed as yet as to the type of "ear muffs" he should purchase for his outfit, but friends predict that all will end well. [2/27/24]

ER

New Product Review:
Heil Classic and Heritage Microphones

--Reviewed by Ray Osterwald, NØDMS

Bob Heil has released two new microphones that are a perfect match to vintage American made amateur radio equipment. From speaking with Bob on the telephone, I have learned that these mics are the products of years of research and development, and they are just as well made and thought out on the inside as they are on the outside.

I asked Bob about what led him to develop these microphones for the Ham community. Here is part of what he had to say:

"...I was very fortunate that back in 1970, Paul Klipsch, the father of the folded horn and genius speaker engineer, flew his Bonanza to our little Southern Illinois town of Marissa so he could see this 50KW sound system I had put together for the ...touring bands....He was stunned by the amount of hardware--semi trucks full. However, after spending two days with him, he taught me more than many full college courses. How fortunate was I to have this time with THE master of audio, Paul Klipsch! One of the important things that I learned was about the Fletcher-Munson curve that Bell Labs had discovered back in the early 30's. They made the discovery of the actual ability of the human ear to hear sounds. Pretty amazing how nonlinear these things on the side of our heads are! The louder the program source, the flatter you hear but at normal room levels....oh my goodness.

After equalizing this 50KW wonder, and working on speaker efficiency, Paul taught me that 50KW became 10KW, but was clearer, cleaner and louder that the 50KW. Just because I had the important frequencies equalized so the listener was able to hear much more articulate audio. This same thing can happen in our RF world. Just because you are running legal limit doesn't mean that you are the easiest to copy on the band. This comes as a great shock to many that do not understand how we hear.

...So many fellows waste power with low-end boomy audio that does not do one thing for articulation. We do not need coloration of the human voice when the signal is in the noise! So, I set out to change things, and we have done this over a 20+ year period just by applying those same principles of the Fletcher-Munson curve.

For the AM operators using vintage gear that demands high impedance microphones, I designed the great new Classic-5. This is the only dual impedance microphone on the market today. I had to develop our XT-1, a 600 to 30,000-ohm [matching] transformer because I couldn't even find a decent one of those that didn't roll off at 400 Hz on the low end! The Classic can be switched from high to low impedance. It has two elements. I hear so many of the AM signals that are so darned bassy and boomy that you can't understand them. ...Putting the power you have into the audio spectrum--that the Fletcher-Munson curve of our ear demands in order to understand the spoken word--is the key..."

The Heil Classic mic is shown in **Figure 1**. It is an exact copy of a 1930's 74B microphone housing and the matching 91B metal base. It is designed to look like a vintage ribbon mic from the period. There is a small switch on the rear that allows the operator to change from a broadcast response to a tailored communications-type response. The microphone comes with a 5-foot cable terminated into a 4-pin XLR connector. Another nice addition is a dust cover that comes as standard equipment.

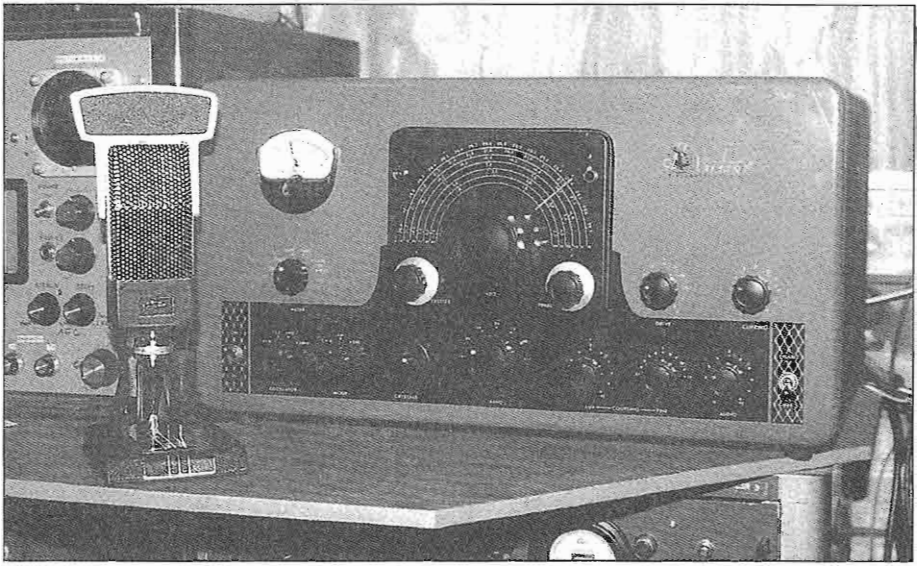

Figure 1: The Heil Classic is in use with a Johnson Valiant and a homebrew receiver at NØDMS. Although the '50s styling of the Valiant doesn't really match the classic 1930's look, I still think they look good together.

Figure 2: A modern classic meets a vintage classic--The Heil Heritage mic and a 1961 Johnson Invader 2000.

Figure 2 shows the Heil Heritage mic. It has been placed on a vintage Federal microphone stand for the photograph, but Heil has an accessory stand, the CB-1, which is cast iron with stainless steel trim and probably matches the style better. The Heritage is a high-quality reproduction of the classic Shure mics from the 1950's that we all remember. The Heritage has a balanced audio output, as do all professional microphones. Heil uses an internal shock mount made from Sorbothane, and a blast screen is standard. This mic starts as a solid steel casting that is polished, copper plated, and then triple chrome plated with polishing between each plating step. The result is an industrial art form with excellent performance.

Like many operators, I have a small collection of vintage microphones. My favorite is a Shure 55 Unidyne Dynamic with a matching base. I got it about 15 years ago as NOS from a Shure dealer. Although it is technically "new" and looks great, I can't really use it. Over the years, the mic element has become brittle, and doesn't reproduce mid-range or high frequencies like it did when the mic was new in 1949. It sounds mushy, and rattles in the higher range if I talk too close to it. I've been told that this is not uncommon with old mics.

Professional audio engineers have expensive and rather exotic equipment that is used to measure mic performance. To test a microphone, one needs to make both electrical and acoustic measurements. These test include measurements for sensitivity, directional characteristics, amplitude response, impedance rating, polarity, acoustic input level, distortion, etc. Unless you have an expensive Time-Energy-Frequency (TEF) analyzer, or an anechoic chamber, the manufacturer's specifications must be relied upon. Output level is typically measured by placing the microphone in a free field (non-reflective) enclosure, and given a standard sound pressure level from calibrated loudspeakers. The open-circuit output voltage is measured with high-impedance bridges. Polar response characteristics are measured with the TEF analyzer, or in an anechoic chamber with high-impedance log voltmeters.

I certainly don't have any of this equipment, and I don't know anyone who does! Hams make direct on-air, A-B comparisons when we get new microphones, and that's what I did with the Heil mics. Be sure to place the test mic in the exact position as your normal mic, and speak at roughly the same distance from it, and with the same voice level. This is because all radio rooms have certain acoustic characteristics, and if the new mic is placed in a different location, audio reverberations and phase shifts might give you false results.

My comparison mics were a nearly new Electro Voice RE-2, and an Electro Voice 667. During an AM QSO, I switched the mics in-line during the QSOs, and only adjusted the audio gain on my transmitter for the same percentage of modulation. In every test, all the listeners reported that the Heil Heritage was as good, or better than, the RE-2. The 667 was inferior to all of the others. A common report was that the Heil mics were easier to understand when band conditions were poor. They look great in the shack, and visitors are always drawn to comment on how good they look.

My conclusions after extensive on-air testing during all kinds of band conditions are that these microphones are a real value. They look great, work great, and are a perfect match to our vintage stations. They are reasonably priced, and the one of the best features is that they are built in the USA, and not in some offshore factory. You get good value for your money, and you are supporting a US-owned business.

ER

New Product Review: The W6WJN 30L-1 Power Supply Replacement Circuit Board

by Dave Harmon K6XYZ
20912 Conradi Ave.
Torrance, Ca. 90502
K6XYZ@comcast.net

Does the world really need another Collins 30L-1 diode replacement board?

Probably not, however, this circuit board is much, much more than just diodes, capacitors and several resistors. It completely replaces the original double deck mounting boards and all power supply components in this venerable Collins amplifier. The single board approach is undoubtedly the way Collins would have originally designed it if the filter capacitors available 44 years ago had been available in today's reduced size and much improved quality.

As furnished, the board is completely assembled and ready to install. All components are mounted on a high temperature 130-degree Centigrade FR4 fiberglass circuit board with solder mask. The bleeder resistors and (16) 1N5408 rectifier diodes are mounted on the topside of the board above ventilating holes to insure maximum convection cooling. The (6) 220mf computer grade 85-degree Centigrade electrolytic capacitors are mounted on the bottom side of the board, keeping them away from the heat generated by the bleeder resistors.

The original Collins capacitor board had a total of 17mf of filtering. This updated circuit more than doubles this figure to 37mf for improved dynamic regulation.

Collins designed the original circuit to achieve a high degree of regulation by using (6) 25K 25 watt bleeder resistors to heavily load the power supply. This generated a lot of unnecessary heat, which is an ever-present problem with the 30L-1.

The selection of bleeder resistor value has been recalculated for lower bleeder current and reduced heat. All resistors in this up-to-date design have been replaced with modern flameproof off-the-shelf components available at any electronic parts supplier. The board uses no special-design components, assuring easy replacement if needed.

Before installation of the new board, I took the opportunity to remove the meter from the front panel and take the movement from its case in order to clean the inside of the glass. I suspect that this simple maintenance had never been done.

Installation of the new power board was easy. The circuit board is furnished with simple step-by-step instructions for removal of the original double deck boards and installation of the new board. I completed the installation in about one hour.

Bill Noonan (W6WJN) approached me to review this new product, and I must say that I am favorably impressed with its design, choice of components, performance, construction and ease of installation. This unit is a bargain at $99.

The board can be ordered from Bill at 650-756-6699 or w6wjn@juno.com

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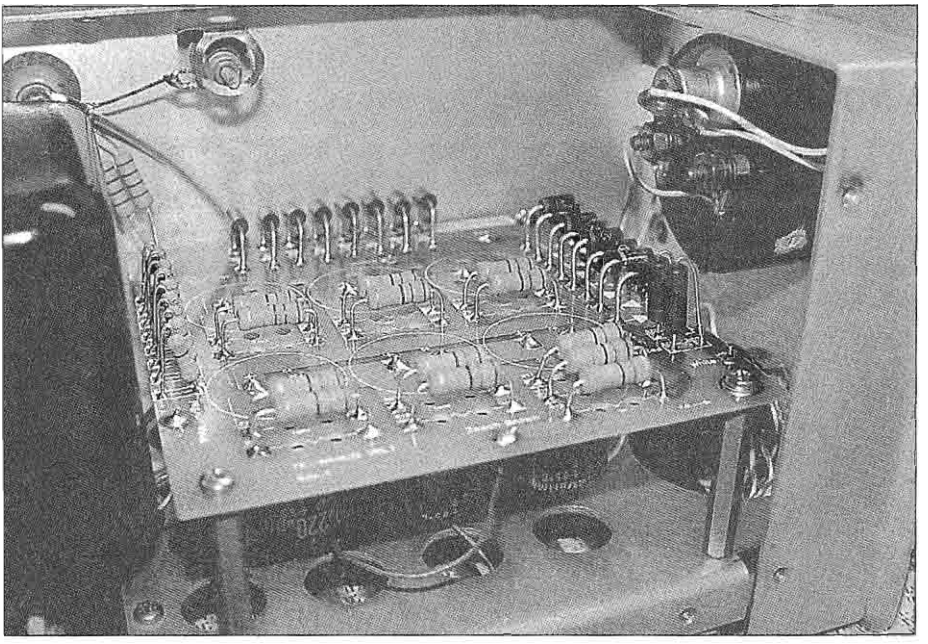

Figure 1: The W6WJN circuit board assembly has been completed and installed in the 30L-1 amplifier case. The filter capacitors are just visible underneath.

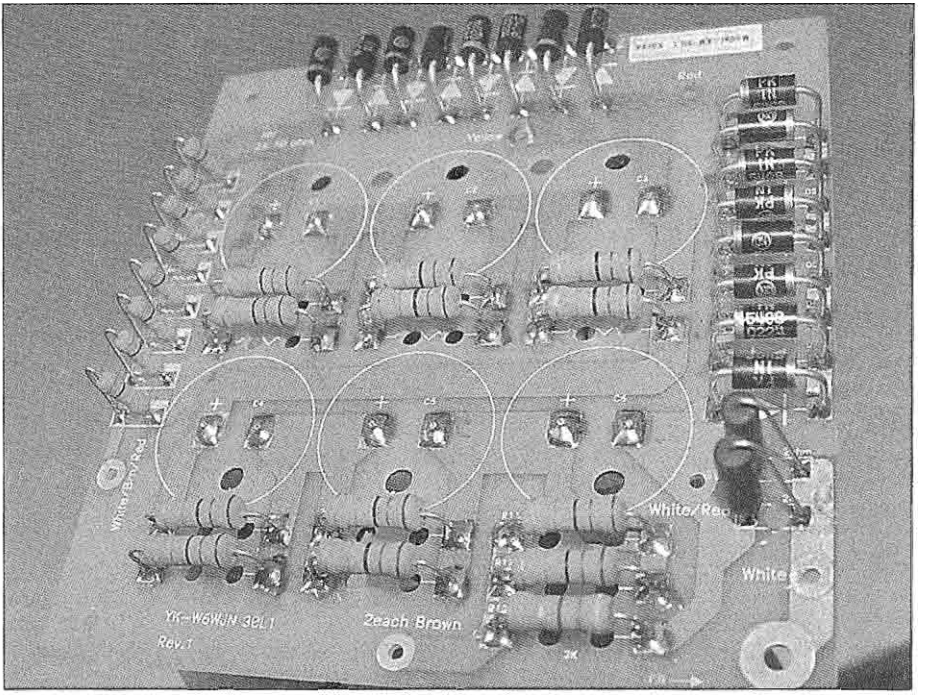

Figure 2: This is how the board will look when it is ready for installation.

VINTAGE NETS

Arizona AM Nets: Sat & Sun: 160M 1885 kc at sunrise. 75M 3855 kc at 6 AM MST. 40M 7293 kc 10 AM MST. 6M 50.4 mc Sat 8PM MST. Tuesday: 2M 144.45 7:30 PM MST.

Boatanchors CW Group: QNI "CQ BA or CQ GB" 3546.5, 7050, 7147, 10120, 14050 kc. Check 80M winter nights, 40 summer nights, 20 and 30 meters day. Informal nightly net about 0200-0400Z.

California Early Bird Net: Saturday mornings at 8 AM PST on 3870 kc.

California Vintage SSB Net: Sunday mornings at 8AM PST on 3860 +/-

Colorado Morning Net: An informal group of AM'ers get together on 3875 kc Monday, Wednesday, Friday, Saturday, and Sunday at 7 AM MT.

Canadian Boatanchor Net: Meets daily on 3725 kc (+/-) at 8:00 PM ET. Hosts are AL (VE3AJM) and Ken (VE3MAW)

Collins Collectors Association Nets: Technical/swap sessions meet every Sunday on 14.263 mc at 2000Z. Informal ragchew nets meet Tuesday evening on 3805 kc at 2100 Eastern time, and Thursday on 3875 kc. West Coast 75M net is on 3895 kc 2000 Pacific time. **10M AM net starts 1800Z on 29.05 mc Sundays, QSX 1700Z.**

Collins Collector Association Monthly AM Night: Meets the first Wednesday of each month on 3880 kc starting at 2000 CST, or 0200 UTC. All AM stations are welcome.

Collins Radio Association nets: Mon. & Wed. 0100Z on 3805 kc., also Sat 1700Z on 14.250 mc.

Drake Technical Net: Meets Sundays on 7238 kc, 2000Z. Hosted by John (KB9AT), Jeff (WA8SAJ), and Mark (WBØIQK).

Drake Users Net: This group gets together on 3865 kc, Tuesday nights at 8 PM Eastern Time. Net controls are Gary (KG4D), Don (W8NS), and Dan (WA4SDE)

DX-60 Net: This net meets on 3880 Kc at 0800 AM, Eastern Time on Sundays. Net control is Mike (N8ECR), with alternates. The net is all about classic entry-level AM rigs like the Heath DX-60.

Eastern AM Swap Net: Thursday evenings on 3885 kc at 7:30 PM Eastern Time. Net is for exchange of AM related equipment only.

Eastcoast Military Net: Check Saturday mornings on 3885 kc +/- QRM. Net control station is W3PWW, Ted. It isn't necessary to check in with military gear, but that is what this net is all about.

Fort Wayne Area 6-Meter AM net: Meets nightly at 7 PM Eastern Time on 50.58 mc. This is another long-time net, meeting since the late '50s. Most members use vintage or homebrew gear.

Gray Hair Net: The oldest (or at least one of the oldest at 44+ years) 160 meter AM nets. Net time is Tuesday evening on 1945 kc at 8:00 PM EST and 8:30 EDT. Also check www.hamelectronics.com/ghn

Hallicrafters Collectors Association Net: Sunday on 14.293 mc, 1730-1845 UTC. Control op varies. Midwest net Sat. 7280 kc 1700Z. Control op Jim (WB8DML). Pacific Northwest net Sunday 7220 kc at 2200Z. Control op Dennis (VE7DH).

Heathkit Net: Sunday on 14.293 mc 2030Z right after the Vintage SSB net. Listen for W6LRG, Don.

K1JCL 6-meter AM repeater: Operates 50.4 mc in, 50.4 mc out. Repeater QTH is Connecticut.

K6HQI Memorial Twenty Meter Net: This flagship 20 meter net on 14.286 mc has been in continuous operation for at least 30 years. Start time about 2400Z winter, 0100Z summer, and goes for about 2 hours.

Midwest Classic Radio Net: Meeting Saturday morning on 3885 kc at 7:30 AM, Central Time. Only AM checkins are allowed. Swap and sale, hamfest info, and technical help are frequent topics. Control op is Rob (WA9ZTY).

MOKAM AM'ers: 1500Z Mon. thru Fri. on 3885 kc. A ragchew net open to all interested in old equipment.

Northwest AM Net: AM activity is daily 3 PM to 5 PM on 3875 kc. The same group meets on 6 meters at 50.4 mc. Times are Sundays and Wednesdays at 8:00 PM. 2 Meters Tues. and Thurs. at 8:00 PM on 144.4 mc. The formal AM net and swap session is on 3875 kc, Sundays at 3 PM.

Nostalgia/Hi-Fi Net: Started in 1978, this net meets Friday at 7 PM Pacific Time on 1930 kc.

Old Buzzards Net: Daily at 10 AM local time on 3945 kc in the New England area. Listen for net hosts George (W1GAC) and Paul (W1ECO).

Southeast Swap Net: Tuesday at 7:30 PM Eastern Time on 3885 kc. Net controls are Andy (WA4KCY) and Sam (KF4TXQ). Group also meets Sunday on 3885 kc at 2 PM Eastern Time.

Southern Calif. Sunday Morning 6 Meter AM Net: 10 AM on 50.4 mc. Net control op is Will (AA6DD).

Swan Nets: User's Group meets Sunday at 4 PM Central Time on 14.250 mc. Net control op is usually Dean (WA9AZK). Technical Net is Sat, 7235 kc, 1900Z. Net control is Stu (K4BOV)

Vintage SSB Net: Sunday 1900Z-2030Z 14.293 & 0300Z Wednesday. Net control Lynn (K5LYN) and Andy (WBØSNF)

West Coast AMI Net: 3870 kc, Wed. 8PM Pacific Time (winter). Net control rotates between Skip (K6YKZ), DJ (K6RCL), Don (W6BCN), Bill (N6PY) & Vic (KF6RIP)

Westcoast Military Radio Collectors Net: Meets Saturday at 2130 Pacific Time on 3980 kc +/- QRM. Net control op is Dennis (W7QHO).

Wireless Set No. 19 Net: Meets the second Sunday of every month on 7270 kc (+/- 25 Kc) at 1800Z. Alternate frequency is 3760 kc, +/- 25 kc. Net control op is Dave (VA3ORP).

CLASSIFIEDS

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Subscribers receive 1 free 20-word ad per month. **Extra words are 20 cents.** Here is how to count the words in your ad: "For Sale" or "Wanted" and your contact information counts as 7 words. Hyphenated words count as 2 words. **Please count the words in your ad as described above, and if you are over 20 words, send payment for the extra words at .20 each.** Note: Not all readers use email, so it is a good idea to include phone numbers.

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Deadline for the March 2004 Issue: Thursday, Feb. 26

FOR SALE: Repair and restoration on all vintage equipment; 45 years experience. Barney Wooters, W5KSO, 8303 E. Mansfield Ave., Denver, CO 80237. 303-770-5314

FOR SALE: Military Radio manuals, orig. & reprints. List for address label & $1. For specific requests, feel free to write or (best) email. Robert Downs, 2027 Mapleton Dr., Houston, TX 77043, wa5cab@cs.com

FOR SALE: Collins 75A-3 beautifully restored by Howard Mills (W3HM). Virgil, W4OLJ, TN, 423-337-6484.

FOR SALE: WRL 3-tube, 6-2 meter VFO, regulated pwr sply, 24 mc out. $30 + ship. 2 military leg keys, model KY-116/U. $29 for both + shipping. Henry Mohr, W3NCX, 1005 W. Wyoming, Allentown, PA 18103-3131

FOR SALE: Hallicrafters SX-28, good condx, in working order. Pickup only. $185. 585-671-2882 or jandjm130@juno.com

FOR SALE: Collins 32S-1, $350. Collins 75S-1, $350. Zenith 8G005TZ1Y, Loctal tubes, Wavemagnet, working, $175. MFJ961, 1.5 KW tuner, $150. Heathkit VF1, $55, HG10, $55. Argonaut 509 and 405 amplifier, $175. Atlas 215 transceiver, working, $85. Siltronics 1011D. George Stevens, WØATA, PO Box 704, Longmont, CO. 80502-0704, 303-776-9036. vintage1@prodigy.net

FOR SALE: WW-2 aircraft radio control boxes, connectors, & parts. Send #10 SASE for list to Mike, POB 1947, Rocklin,CA, 95677

FOR SALE: TMC GPR-90RX - $650, Globe King 400B - $475, Collins package: 75A-1/270G-1/32V-2 - $1100, Johnson KW Matchbox - $400, Johnson 275W Matchbox (mint) - $275, Spark stuff – inquire. Gary, WA9MZU, 209-286-0931 or ghal@ix.netcom.com

FOR SALE: Collins 30L-1 WE. Very clean. No dents. Filter caps have been replaced. $625. Joel, W4SLH, 337 Compass Point Dr., Oriental, NC 28571, 252-249-2344, jmele@always-online.com

FOR SALE: Johnson Invader 2000. 2000 watt transmitter. The power has been rebuilt with all new Peter Dahl iron. Extremely good condition. $1285 Joel, W4SLH, 337 Compass Point Dr., Oriental, NC 28571, 252-249-2344, jmele@always-online.com

FOR SALE: Eimac 4-1000A with chimney, socket, & filament Xfmr $155. Joel, W4SLH, 337 Compass Point Dr., Oriental, NC 28571, 252-249-2344, jmele@always-online.com

FOR SALE: H-P 8708A synchronizer, 606B signal generator, working, $150 ea + shipping. Buddy, WB4ARK, 704-366-6600 buddyh@bellsouth.net

FOR SALE: HT32-B $350 + shipping, but prefer PU. Ed Sauer, 787 N. Peterman Rd., Greenwood, IN 46142 (317) 881-1483

FOR SALE: United Electronics JAN 204-A tubes. Appear to be new, $65 each, 3 available. Tom Berry, W5LTR, 1617 W. Highland, Chicago, IL 60660, 1-773-262-0016 OR 1-773-262-5360.

FOR SALE: Amplifier-(microphone) Pacemaker model PM10 (Columbus OH) @10, $50. Amplifier Hewlett Packard model 405A @10 $60. Bernie Samek, 113 Old Palmer Rd., Brimfield, MA 01010, 413-245-7174, FAX 0441.

FOR SALE: NAB Engineering Handbook, 6th edition, almost mint. $20 plus shipping. W9OLD, 574-542-2591 anytime.

FOR SALE: Weston model 772 analyzer, $15. HP 456A current probe, manual copy, $45. Ross Wollrab, 229 N. Oakcrest Ave, Decatur, IL 62522-1810. 217-428-7385 rewollrab@aol.com

FOR SALE: Viking Courier, Realistic DX-150A, Gonset Comm III 6m, Heathkit DX60, HG10B, SB610, AM-2, B&W TR Switch, HA1 TO Keyer, MFJ 945C, Collins PTO and more. http://WWW.AF4K.COM or call: 407-323-4178

FOR SALE: Hallicrafters HT-32A Transmitter in good condition $300.00. Bob Braza, W1RMB 508-222-5553.

FOR SALE: E.H. Scott 1944 RBO-2 Navy receiver. Best offer over $200. Bruce Beckeney, 5472 Timberway Dr., Presqueisle, MI 49777, 989-0595-6483

FOR SALE: Tektronix Type LC-130 capacitance/inductance meter $95. HW-101 HP-23C $175. Norm Roscoe, PO Box 402, West Bridgewater, MA. 02379, 508-583-8349.

FOR SALE: Heath HD-15 phone patch $25. National NC-60 rcvr $60. Lafayette Comstat 19 CB $50. RCA WO33A O-scope $25. Hallicrafters Sky Buddy II rcvr $50. Al Jenkins, WA1RWB, 5 Daley CT, Box 1162, Nantucket, MA 02554, 508-325-7122 Eves.

FOR SALE: DX-35, DX-40 reproduction crystal doors. $11.50 shipped. Texans add 8.25% sales tax. Glen Zook, 410 Lawndale Dr., Richardson, TX 75080

FOR SALE: Request free vintage flyer. USA only. 50 years of mail order electronics. Bigelow Electronics, POB 125, Bluffton, OH 45817-0125

FOR SALE: QST, 1946 Jan, Feb, Apr, May, June, July, $5, 1957, all $10 + shipping. Alan Lurie, W9KCB, 309-682-1674, 606 E. Armstron Ave., Peoria IL 61603

FOR SALE: Heathkit AA32 Amp. Farm radio. Microphone-American of L.A., Wire recorder + player-good. Paul Recupero, 265 Union St. Portsmouth, RI 02871-2264 1-401-847-8599

FOR SALE: Countermeasures receiving set AN/WLR-1D, 50-10750 MHz, 9 bands, simultaneous display of frequency, spectrum, and modulation info on dual displays, manual, 1200 lbs., $4,500. Carl Bloom, 714-639-1679, carl.bloom@prodigy.net

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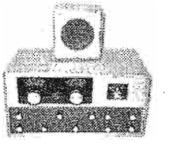
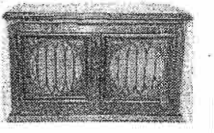
Estes Auctions will offer the Radio Collection of Dr. Brakel at our Feb. 21 Sale. Dr. Brakel is relocating and wishes to dispense his collection, including Amateur Radio Equipment.

The Collins "S" Line, Drake R 4B, Heath Kit HW 101 w/Power Supply, Heath Two K.W. Amp, SB-101, 1948 Ray Theon TV (works), Atwater-Kent Model 12 Breadborad, Radiola IV, Scott Philharmonic in a Warrington Cabinet, Radiola 3 and 3A, Radiola V, Western Electric 4-D, Western Electric 7A, Western Electric 10-D Horn Speaker, Kennedy Model XV, Kennedy Model 220, Music Master Horn Speaker, other Horn Speakers, Battery Sets, lots of Test Equipment, Books, Tubes, Tower Ship Cone Speaker.



Phonographs Edison Amberola 50, Amberola 30, Edison Standard w/Morning Glory Horn, Edison Lab Model Diamond Disc Player, Motorola 9T1 Television, Zenith 12H676 Console, Hallicrafters SX-111, Collins 51-J4 Receiver, National NC-57, Hallicrafters S-107, Knight R-100A, 5 Transoceanics, many pieces of 50s and 60s Ham Gear.



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FOR SALE: Galena crystal radios, homemade, also parts, with pix available. Radio tubes, most used, free lists. Len Gardener, 458 Two Mile Crek Rd., Tonawanda, NY, 14150. email: radiolen@att.net

FOR SALE: Naval Receivers RAK, RAL, RAO, RBA, RBB, RBC, RBL, RBM. Some checked, pwr splys available. $75-$450 depending on condx. Many other types. Carl Bloom, 714-639-1679. carl.bloom@prodigy.net

FOR SALE OR TRADE: QST, full years, excellent condition. 1950 thru 1960, plus 1944 missing September. $10 per year plus shipping from 10021. Or trade for CQ 1950 thru 1969. Ken, W2EWL, 212-288-1310, ken44@nyc.rr.com

SALE/TRADE: BC-1335/Delco, RT-66/GRC, TA-12C. NOS: 304TL, 4-125A, 872/ stacks. NCX-3, S-108. Wanted: RCA Radiomarine T-408/URT-12, info. Sam KF4TXQ PO Box 161 Dadeville, AL 36853-0161 stimber@lakemartin.net 256-825-7305

FOR SALE/TRADE: Original manuals: SX-96, SX-122A, SX-146, SR-150, FPM-300, SR-400, TR-4, R-4B, HQ-145. Ni4q@juno.com 407-351-5536

FOR SALE: Tested good globe 201A $14, 226 $15, 227 $10 and others. Slightly weak tubes guaranteed to work in early radios ½ price shown. Write or e-mail: tubes@qwest.net for a new price list or see www.fathauer.com. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281, 480-968-7686. Toll Free 877-307-1414

FOR SALE: Authorized repairs and sales of all types of amateur radio and communications equipment, and also test equipment. Please call us at LAND AIR COMMUNICATIONS, 718-847-3090 and visit our web site: www.landaircom.com. We have over 3,000 items in inventory and carry all types of communications parts.

FOR SALE: Vintage Radio Service. We repair radios, record changers, radios home, auto, tube & transistors. 1930-1980. Ken Hubbard, KA9WRN, POB 792, Beloit, WI 53512. 608-362-1896

FOR SALE: Radio books, magazines, catalogs, manuals (copies), radios, hi-fi, parts. Send 2 stamp, LSASE. David Crowell, KA1EDP, 40 Briarwood Rd., North Scituate, RI 02857. ka1edp@juno.com

FOR YOUR MUSEUM. Build working replica of 1954 "Boys First Receiver." One tube DX'er. Easy project for your Grandson. Complete plans, 32-page book reprint $5 ppd. Bob Ryan, 1000 S. Gilbert St., Apt 132, Hemet CA 92543-7065

FOR SALE: Collins Radio stock certificates, 33 avail, 10-share (green) or 100-share (blue), issued to various companies. $20.00 each, limit one per customer. Check or MO. No choice on color. William O. Dean, KC7ICH, PO Box 3105, Tonopah, NV, 89049

FOR SALE: Your old QSL card? Search by call free, buy find at $3.50 ppd. Chuck, NZ5M, NZ5M@arrl.net

FOR SALE: Repair, Restore, Sales of antique, vintage tube radios. John Hartman, NM1H, www.radioattic.com/nm1h

FOR SALE: New Ranger 1, Valiant 1, & Navigator plastic dials, freq numbers in green, with all the holes just like orig. - $17.50 ppd. Bruce Kryder, W4LWW, 277 Mallory Station Dr., Ste. 109, Franklin, TN 37067. bak@provisiontools.com

FOR SALE: KWM2/S-line metal logo pins. Meatball or winged. Excellent replica of the original. Put one on your hat, badge, or replace a missing logo on your panel. $6.25 shipped. W6ZZ, 1362 Via Rancho Prky, Escondido, CA 92029. 760-747-8710, w6zz@cox.net

FOR SALE: Used technical books: radio, electronics, math, military, magazines, etc. List: $1 (stamps OK). Softwave, 2 Dept. ER, 1515 Sashabaw, Ortonville, MI 48462

FOR SALE: R.L. Drake repair and reconditioning, most models including TR-7's, 35 years experience. Jeff Covelli, WA8SAJ, 440-951-6406 **AFTER 4 PM**, wa8saj@ncweb.com

NOTICE: Visit Radioing.com, dedicated to traditional ham radio & vintage radio resources. Let's Radio! Charlie, W5AM. http: / /www.radioing.com.

FOR SALE: Heath Nostalgia, 124 PG book contains history, pictures, many stories by longtime Heath employees. (See ER BOOKSTORE) Terry Perdue, 18617 65th Ct., NE, Kenmore, WA 98028

FOR SALE/TRADE: Transmitting/ Receiving tubes, new & used. $0.55 & LSASE for list. I collect old & unique tubes of any type. **WANTED:** Taylor and Heintz-Kaufman types and large tubes from the old Eimac line; 152T through 2000T for display. John H. Walker Jr., 13406 W. 128th Terr. Overland Park, KS 66213. PH: 913-782-6455, Email: jhwalker@prodigy.net

FOR SALE: Treasurers from the closet! Go to www.cjpworld.com/micromart to find some unique items many hams would lust for! Gus, WA, 360-699-0038 gus@wa-net.com

FOR SALE: Vintage equipment at the K8CX Ham Gallery Classified Ads section. Visit the largest Antique QSL Card Gallery http:/ /hamgallery.com

FOR SALE: Lots of old radio & related books. Eugene Rippen, WB6SZS, www.muchstuff.com

FOR SALE: Strong steatite antenna insulators. Lengths from two to fifteen inches. SASE for list. John Etter, W2ER, 16 Fairline Dr., East Quogue, NY 11942. 631-653-5350

Mil-Spec Communications
R-390, R-390A, R-388 & Other Military Receivers
Sales - Service -Manuals - Parts
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FAX: 941-474-7874
milspec39Ø@aol.com
"Since 1985"

FOR SALE: Please visit RadioWorld-Online.Come to see our ham gear, parts, and more. Carl Blomstran PO Box 890473 Houston Tx. 281-660-4571.

FOR SALE: Spun Aluminum Knob Inlays for most Boatanchors. Collins Dial Drum Overlays. Dakaware Knobs. Charlie Talbott, 13192 Pinnacle Lane, Leesburg VA 20176-6146. 540-822-5643, k3ich@arrl.net

FOR SALE: Build your own "Midget" bug replication by KØYQX, ca 1918, featured by K4TWJ in CQ Magazine, May '98. 10 detailed blueprints. FAX: 507-345-8626 or e-mail bugs@mnic.net

FOR SALE: Parts, tubes, books, ECT. Send two stamp SASE or email for list. Wayne LeTourneau, POB 62, Wannaska, MN 56761 wb0cte@arrl.net

FOR SALE: Collins restoration. Everything inside & out to make it as Art Collins built it. 50 yrs experience. W9OJI / N4FZ, IL, 815-734-4255 or N4PZ@aol.com

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB-$24.95 ppd for complete kit! HI-RES, 8232 Woodview, Clarkston MI 48348, 248-391-6660, info@hi-rescom.com

FOR SALE: Complete hardware set to connect Collins PM2 to KWM2 -$19.95 ppd. Warren Hall, KØZQD, POB 282, Ash Grove, MO 65604-0282

FOR SALE: New Release. For details send 2-stamp LSASE to: Olde Tyme Radio Co, 2445 Lyttonsville Rd. Ste 317, Silver Spring, MD 20910

FOR SALE: Repair, upgrade, performance modification of tube communications & test equip. Accepting most military, all Collins & Drake designs, & the better efforts from others. Laboratory performance documentation on request. Work guaranteed. Chuck Felton, KDØZS, Felton Electronic Design, Box 187, Wheatland, WY 82201. 307-322-5858

feltondesign@yahoo.com

FOR SALE: Military and commercial communications items. Murphy's Surplus, 401 N. Johnson Ave., El Cajon, CA 92020. 619-444-7717 www.Murphyjunk.com

FOR SALE: Tube list, new & used, wide variety audio, and ham. Recently expanded. SASE 52c. Bill McCombs, WBØWNQ, 10532 Bartlett Ct., Wichita, KS 67212-1212

FOR SALE: PANEL AND CABINET REFINISHING; Johnson, Hammarlund 180(a), R390(A), & others total restoration & sales; My updated web site: http://w4pnt.8k.com Patty & Dee's Marina; Dee Almquist, 534W. Main St., Waynesboro, VA 22980. 540-249-3161 Cell: 540-480-7179, FAX 540-249-5064

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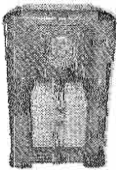
Radio Auction

"The Joseph Koester Collection"
Saturday, February 21, 2004 at 10 am EST
at the "Expo Auction Center"
8157 Garman Rd., Burbank, Ohio
(Exit 204 off Interstate 71)

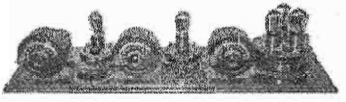
Estes Auctions is pleased to offer the excellent Radio Collection of Joseph Koester from Crossville, TN. Joe collected ***Scott*** and ***Zenith*** items and is well known in the radio community as well as amateur radio, his call sign W4NSA. Some of the items in the sale are as follows:

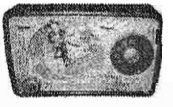
1938 Zenith 15U269, Zenith 15U270/271, 1938 Zenith 15U272 "The Georgian", 1938 Zenith 15U273 "The Louis XV", and 16 Tube 16A61 "Stratosphere", Zenith Chairside 95-244, Zenith Model 12A58, Zenith Model 1005, Zenith 809 Chrome Front 1935, Zenith 829 Chrome Front 1935, Zenith 835 Chrome Front 1935, Zenith Zenette Cathedral, McMurdo Silver Masterpiece 5, also a 15"-17" for restoration.

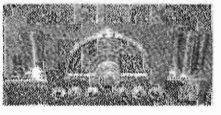
1936 Scott 7 Knob All Wave 23 w/Volume Expander in a Laureate Grand Cabinet, 1935 Scott 5 Knob All Wave 23 with Silver Strips on the Grill in Westerly Grande Cabinet, 1935 Scott All Wave 23 in a Tasman Cabinet, 1939 Philharmonic AM-FM with Beam of Light Tuning in a Warrington Cabinet. Other Scott Radios and Philco 38-690 20 Tube w/7 Speakers, Ecco Round British, General Motors Presentation Radio, Guild T Pot w/Trivet, Trophy Bowling Ball Radio, Brass Piano Radio, Sparton 557 Sled, Emerson Snow White, General Television Piano, Air-Line Lone Ranger, Air-Line Rudolph the Reindeer, Hopalong Cassidy Radio (Black), Magic Tone "RDR" Bottle Radio, Zenith Business Card Holder, Colonial Model 158 Globe Radio, Wings Cigarette Radio Model R-28-BW and R-28-BWC, Guild Buttons & Bows Radio, Majestic Charley McCarthy.

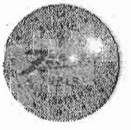


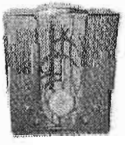
Other items: Zenith Adv. Clock, Crosley Adv. Clock, General Motors Ash-Tray Radio, Microphone Radios, General Electric Model 91 Grandfather Clock-Radio, Horn Speakers, Atwater Kent Model 10 Breadboard, Atwater Kent Model #9 Breadboard, Pilot TV, Predicta TV-Remote Tuner, Zenith Radio & TV Neon, Philco Adv. Clock, Atwater Kent Model 84, Radacron Cathedral, Jackson Bell Tombstone, Zenith 6S-428 Tombstone, Zenith 6S-229, 85531, 5R216, 6D249, Crosley 167, Majestic 50, Majestic Model 421, Marconi Phone Mod. 283, Philco 37-84B, RCA 121, Philco 37-610, Kinsey 46-8-cdl.











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FOR SALE: RIT for Collins KWM-2/2A; No modifications needed. $79.95 SASE for details. John Webb, W1ETC, Box 747, Amherst NH 03031 bigspndr@bit-net.com

FOR SALE: Aluminum heat dissipating plate and grid connectors for all 3, 4 and T series Eimac tubes including 3-500Z, 4-1000, 304T's and others. Alan Price fixr7526@cs.com

FOR SALE: Ships radio room clock repros, boatanchor mugs and t-shirts, more. http://www.cafeshops.com/amradio,amradio2

FOR SALE: I built hot-rod receivers; R390A, SP-600, R-388/51J. NC-183D...and transmitters: Valiant, DX-100, T-4X-A-B, HT-32. 51J-4 filter replacements, R390A Hi-fi AM $245.00 ea. Chuck Felton, KDØZS, Wyoming, 307-322-5858, feltondesign@yahoo.com

FOR SALE: Collins reproduction items available through the CRA on www.collinsra.com. Join the CRA and subscribe to the Collins Journal. Dave, W3ST

FOR SALE: Heathkit gear, working, with manuals: SB102 transceiver $200, HW100 $200, SB500 2M transverter, $130. SB650 display $135. Or, $500 for all. S-85 $115, very clean, works great. Multi-Elmac PMR-8 rcvr, M10 PS, $160. Icom R-71A $425 w/ manual. Trades with cash considered. Realistic PRO-2006, $550. Ron, MI, 517-374-1107

FOR SALE: Heath HA-14 " KW Kompact" w/HP-24 AC supply, as new Collector Grade, $425. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973-728-2454. rprester@wawick.net

FOR SALE: Hallicrafters HA "TO Keyer" $75. S77A $50. Heath GR84A rcvr $25. Oscilloscope 10-4205 $50, HRO-60 80-10 meter coils $300. **WANTED:** B&W 1KW bandswitch #850. Richard Cohen, 813-962-2460

FOR SALE: National 697-W power supply $75/OBO. PARTING OUT: HRO-W (no coils). SX-25, SX-32 and SX-100 (no cabinets). Describe your needs. Robert Baumann, 1985 So. Cape Way, Lakewood, CO 80227 rgbdenver@att.net.

FOR TRADE: Two good RCA 833A's for one Taylor 833A. Also looking for Taylor 204A, 813, TR40M. John H. Walker Jr., 13406W. 128th Terr., Overland Park, KS 66213. PH: 913-782-6455, Email: jhwalker@prodigy.net

WANTED: Fully functional with manuals: Johnson AN/FRT505 transmitter, Swan F51 and FC76. Contact Ric at C6ANI@arrl.net

WANTED: Heathkit SB-220 and HDP-21 or 21A. Stan Sepiol, AB2MA, 556 Benjamin Rd, Cayuta, NY 14824, 607-739-3276.

WANTED: Precision Series E-200 or E-200-C signal generator in good working order. Robert Hazuka, 810-765-9391, 6764 Springborn, China Twp., MI 48054.

WANTED: Cabinet for RME-45. Panel opening 101/2" X 19" by at least 101/2" deep. Will buy non-RME cabinet or junker. Robert Haworth, W2PUA, 112 Tilford Rd. Sommerdale, NJ, 08083 856-783-4175.

WANTED: Top dollar paid for WWII radios, PRC-1, PRC-5, AR-11, SSTR-1, SSTR-5, British B2, need pts for PRS-1 mine detector. Steve Bartowski, 708-863-3090

WANTED: Operating instructions or diagram for a Hickok VTVM model **209B**. W.J. Klewchuk, POB 927, Wadena Sask., Canada SØA 4JØ.

WANTED: DAVID GRIMES: especially model 3XP and other D.G. radios, advertising, ephemera, literature; please contact: Mike Grimes, K5MLG; 3805 Appomattox Cir; Plano, Texas, 75023, 972-867-6373 email: grimesm@flash.net

WANTED: AM Marine Xcvr Schematics, Kaar 220, Apelco AE-274m,Pearce Simpson Catalina 55, w7isj@juno.com 520-886-3087

WANTED: 7X7X2 aluminum chassis with bottom plate NIB, connector for BC-312 rcvr. Louis L. D'Antuono, 8802-Ridge Blvd., Bklyn, NY 11209. 718-748-9612 AFTER 6 PM Eastern Time.

WANTED: Manual or copy for Heath SM-104 frequency counter. Thanks, John T. Myers, W8KJU, POB 485, Jenison, MI, 49429-0485

WANTED: Knight Kit T-150 transmitter. Jerry Boles, N5KYE, OK, 1-405-373-4727

WANTED: Service notes on RCA Model R-80 receiver: Jack, 419-499-1308 or NI8N@accnorwalk.com

WANTED: LS206 dual speaker, receiver multicoupler, 51S1 and T368. Ward Rehkopf, K8FD, 137 Pheasant Run, Battle Creek, MI 49015. radiohound2@yahoo.com

WANTED: National Type B vernier dial for my SW3. Thank you, Len Gardner, W2QBC, 458 Two Mile Creed Rd., Tonawanda, NY, 14150. email: radiolen@aol.com

WANTED: Prop pitch rotator, any condition. George Sensibar, W9RR, PO Box 280, Dacula, GA 30019. 770-962-6800

WANTED: Lafayette HA-226 receiver. J. Hudanick, 125 East Jennings St. Wood River, IL 62095, 618-254-9664.

WANTED: Linear Data books #1 and #2 of National Semiconductors Corporation. R. Wieschhoff, 7, rue du Debuche, F-78120 Rambouillet, France; T/FAX: 0033 1 304 111 02

WANTED: Astroplane CB base antenna w/ all original parts Rex 812-282-4824

WANTED: Oscillator Transformer Z1-12 and CRT graticule for SP-44 or PCA-2 type T-200 panadaptor. Parts unit considered. Ivan, WA6SWA, 703-237-9511, ihxxv@cox.net

WANTED: Original panel meter for a Gonset GSB-101 amplifier. Ed Cuevas, 1602 Forest Bend Lane, Keller, TX 76248. 817-222-5355 ecuevas@juno.com

WANTED: HT-33 amplifier (Not the HT-33A). W8JKS, 1344 McDonald Hill Road, Frankfort, OH 45628-9575, 740-998-4518

WANTED: Heathkit AT1 meter, knobs, parts. W3MNE, 1598 Brimfield Circle, Eldersburg, MD 21784

WANTED: Coils for an EICO model 710 grid dip meter. Bob Farricy, K2QZ, 315-472-2702 rfarricy@twcny.rr.com

WANTED: Please, help me in my NC-183D restoration. Need: S-meter, knobs, toggle switches, bottom covers, L40, T12. If needed, have contact in USA for shipping purposes. NC183D Winter Project: http://jvgavila.com/nc183d.htm. Thanks! JOSE eb5agv@ctv.es

WANTED: Scott Special Communications rcvr. EA4JL, please call Kurt Keller, CT, 203-431-9740, k2112@earthlink.net

WANTED: Technical Materials Corp. model DCU combiner, DVM monitor, LPP patch panel, LSP speaker, DCP power panel VOX V.F.O., CFA converter, and PSP-1 power supply. K8CCV, Box 210, Leetonia, OH 44431-0231, 330-427-2303.

WANTED: ANY Harvey-Wells speaker, aircraft unit, or military surplus component. Will answer all. Kelley, W8GFG, 9010 Marquette St., St. John IN, 46373, 219-365-4730

WANTED: SCR-602 components, BC-1083, BC-1084 displays, and APS-4 components. Carl Bloom, 714-639-1679

WANTED: WW2 Navy MBF transceiver, hopefully unmodified. John Svoboda, W6MIT 530-672-0903 or svoboda@directcon.net

WANTED: Collins 310B-3, basket case OK, 70E-8A PTO per 1948. Chicago CMS-2, pair of Taylor T-21. Jerry, W8GED, CO, 303-979-2323.

WANTED: HQ129X cabinet. Condition not important since I can strip and re-paint if necessary. Joe Fell, W3GMS, e-mail joseph.fell@Unisys.com or phone 610-648-4425.

WANTED: James Millen coils 42080, 42040, 42015, 43015. Navy SE2511/SE2512 receiver, SE2513 coil set. Gary Carter, WA4IAM, 1405 Sherwood Drive, Reidsville, NC 27320. Phone: 336-349-1991. Email: gcarter01@triad.rr.com.

WANTED: Correspondence with others (am incarcerated) on Military (especially R-390's & backpacks) and tube rigs. Also looking for copies of old surplus catalogs postwar thru 90's. W.K. Smith, 44684-083, FCI Cumberland Unit A-1, POB 1000, Cumberland, MD 21501.

WANTED: #33A and #35 Universal SW-3 coils for cash or other coils. Hank Bredehorst, 2440 Adrian St Newbury Park, CA 91320. 805-498-8907 quailhill@earthlink.net

WANTED: 23 channel tube-type CB radios for 10-meter conversions. Also tube-type 10-meter linear amplifiers. Ed, WA7DAX, 1649 East Stratford Ave., Salt Lake City, UT., 84106. 801-484-5853

WANTED: Looking for the emblem of National "NC". Katsu JO1GEG/ex.N8EYH, khirai@ieee.org

WANTED: Audio transformers, with good windings, for Westinghouse RADA and Aeriola SR. amplifier. Paying $40.00 each plus shipping. Roland V. Matson, POB 956, Lake Panasoffkee FL

WANTED: WW-2 Japanese Military Radio of any kind. Yokohama WW-2 Japanese Military Radio Museum, Takashi Doi, 1-21-4,Minamidai, Seyaku, Yokohama, 246 Japan takadoi@carrot.ocn.ne.jp http://www.yokohamaradiomuseum.com/

WANTED: Collins R-389 LF receivers, parts, documentation, anecdotes, antidotes. W5OR Don Reaves, PO Box 241455, Little Rock AR, 72223 501-868-1287, w5or@militaryradio.com, www.r-389.com

WANTED: Any TMC Equipment or Manuals, what have you? Will buy or trade. Brent Bailey, 109 Belcourt Dr.,Greenwood, S.C. 29649 864-227-6292 brentw@emeraldis.com

WANTED: Older rigs & accessories. Brian Carling, AF4K, 117 Sterling Pine St., Sanford, FL 32773. http:/ /come.to/AF4K/

WANTED: National NTE CW xmtr in working Condx. I love National. Sylvia Thompson, 33 Lawton Foster Rd., Hopkinton, RI 02833. 401-377-4912. n1vj@arrl.net

WANTED: National Co. emblems, escutcheons, and logos from equipment, also National AN/WRR2 in working order. Don Barsema, 1458 Byron SE, Grand Rapids, MI 46606. 616-451-9874. dbarsema@prodigy.net

WANTED: Top prices paid for globe shape radio tubes, new or used. Send for buy list or send your list for offers. Write or email: tubes@qwest.net See WWW.Fathauer.Com or send for catalog of tubes for sale. George H. Fathauer & Assoc., 688 West. First St., Ste 4, Tempe, AZ 85281. 480-968-7686, Call toll free 877-307-1414

WANTED: ARC-5 rcvrs, racks, dynamotors. Jim Hebert, 1572 Newman Ave. Lakewood, 0H 44107.

WANTED: Old military radar displays, scopes, antennae, receivers, manuals, etc. Even half ton items! William Donzelli, 15 MacArthur Dr., Carmel, NY 10512. 847-225-2547, aw288@osfn.org

WANTED: Seeking unbuilt Heathkits, Knight kits. Gene Peroni, POB 7164, St. Davids, PA 19087. 610-293-2421

WANTED: Western Electric horns, speakers, amps, and mics. Barry Nadel, POB 29303, San Francisco, CA 94129. museumofsound@earthlink.net

WANTED: Manuals, manuals, and manuals for radio-related equipment to buy or swap. Catalog available. Pete Markavage, WA2CWA, 27 Walling St., Sayreville, NJ 08872. 732-238-8964

WANTED: Postcards of old wireless stations; QSL cards showing pre-WWII ham shacks/equip. George, W2KRM, NY, 631-360-9011, w2krm@optonline.net

WANTED: Info on xmtrs made by Clough-Brengle Co. Used by the CCC, in the mid to late 30's. Any help would be greatly appreciated. Ron Lawrence, KC4YOY, POB 3015, Matthews, NC 28106. 704-289-1166 hm, kc4yoy@trellis.net

WANTED: WW II Japanese xmtrs & rcvrs (parts, plug-in coils) for restoration & ER articles. Ken Lakin, KD6B, 63140 Britta St., Ste. C106, Bend, OR 97701. 541-923-1013. klakin@aol.com

The Collins Video Library

The Collins KWM-2 Video (4 hours, $89.95) Highly detailed video on operation, rebuilding, alignment, troubleshooting, and neutralization of this classic! A must for anyone who owns and operates a KWM-2 or 2A. Printed documentation included.

The Collins 75S-3 and 32S-3 Video (3.5 hours, $74.95) An excellent in-depth examination of the most popular version of the S-Line equipment. Operation, modification, alignment, neutralization are covered and more! Much of this information applies to all versions of the S-Line!

The Collins 30L-1 video (1 hour, $39.95) This is a complete guide to the 30L-1 amplifier. Topics covered are operation and safety, updates, and a discussion of the classic 811A triode. Learn the secrets to greater performance.

The Collins 30S-1 video (1 hour, $39.95) Finally, here is the one everybody has wanted! This extraordinary video describes operation and user safety, maintenance and modifications of this classic Collins powerhouse amplifier. Very informative--truly a must for all 30S-1 owners. Complete with printed documentation.

The Collins Amateur Radio Radio Eqipment Video Spotter's Guide (1 hour and 40 minutes, $24.95) Close to 90 individual pieces of Collins Radio equipment are shown in the video. Examples of some of the gear covered are: KW-1, KWS-1, 30K-1, 20V-3, 75A-4, KWM-2, S-Line, KWM-1, 30S-1, 30L-1, KWM-380 and much more. Study up before that next hamfest!

The Collins KWS-1 Video (2 hours, $39.95) This video is the perfect companion to the 75A-4 video for owners of the "Gold Dust Twins"! Butch Schartau (K0BS) shows you how to operate, maintain and repair your KWS-1. Watch as Butch goes theough the entire alignment and neutralization process, as well as showing you how to properly operate this famous transmitter.

The Collins 75A-4 Video (4 hours, $89.95) This video is four hours of great information on how to repair, maintain and restore this classic receiver. Butch Schartau (K0BS) guides you through all aspects of keeping your 75A-4 running like a top.

R-390A Video (7 hours, $109.95) At last it's available! Long awaited by serious "boatanchor" enthusiasts this is a great video all about the ultimate receiver. Now you will have the ultimate video to go along with it. R-390A expert Chuck Rippel (WA4HHG) covers an absolutely incredible array of information in this "heavy duty" video. This video looks at operation, the receiver modules, complete circuit description, front and rear panel details, complete mechanical and electrical alignment, PTO details, and performance evaluation, modifications, troubleshooting, and restoration. There is nothing like this video available today, at any price!

R390A Addendum Video ($49.95) Another 3 hours and 40 miutes of R-390A information from Chuck Rippel (WA4HHG).

SP-600JX Video (4 hours, $89.95) In this video, Chuck Rippel takes us through all aspects of SP-600-JX servicing including repairs, restoration and modifications. This video is a must for any new owner needing to work on the SP-600.

Purchase three or more videos and get 10% off of the retail price!
Add $5.95 each for the first two videos for shipping and handling in the USA, additional videos are shipped free.

Produced by Floyd Soo, W8RO (ex-KF8AT)

ER BOOKSTORE, PO BOX 242, BAILEY COLORADO, 80421-0242
Now Available on-line at WWW.ERMAG.COM

WANTED: Searching for RME CT-100 or 3R9 xmtrs and info about them. David Edsall, W1TDD, 156 Sunset Ave., Amherst, MA 01002. 413-549-0349, dedsall@crocker.com

WANTED: Orig Heath manuals for ham & test equip. Please state condx & price. Warren, K1BOX, NC, 828-688-1922, k1box@arrl.net

WANTED: WW II German, Japanese, Italian, French equipment, tubes, manuals and parts. Bob Graham, 2105 NW3Oth, Oklahoma City, OK 73112. 405-525-3376, bglcc@aol.com

WANTED: Heath Gear, unassembled kits, catalogs and manuals. Bill Robbins, 5339 Chickadee Dr., Kalamazoo, MI 49009. 616-375-7978, billrobb@net-link.net

WANTED: I wish to correspond with owners of National FB7/FBXA/AGS coil sets. Jim, KE4DSP, 108 Bayfield Dr., Brandon, FL 33511 j.c.clifford@Juno.com

WANTED: Tektronix memorabilia & promotional literature or catalogs from 1946-1980. James True, N5ARW, POB 820, Hot Springs, AR 71902. 501-318-1844, Fax 623-8783, www.boatanchor.com

Announcing the Felton Electronic Services R390F High Performance HF Receiver

The Felton Update Engineered R390A comes with speaker, antenna, lab quality alignment and service, plus full guarantees. All the upgrades are hand wired with parts like original and include the following excellent upgrades:

Audio: 2 watts hi-fi audio, low-distortion Class A stages with all low-level stages reworked for lowest distortion and noise. Three new audio filters are front-panel selectable: 4 kc LP, voice only 250-2700 cps, or CW at 250 cps BW.

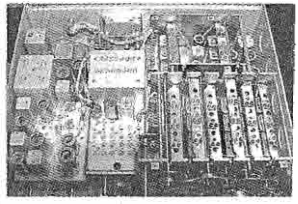
Enhanced sensitivity and large signal handling: This includes installation of a new 6BZ6 RF amplifier and a linear diode detector. Minimum discernable signal is at least -145 dbm.

All-new AGC system: No overshoot, pumping or distortion. Many advanced features, characteristics are optimized for AM and CW-SSB.

Line audio channel reworked to drive your low-impedance headphones through a stereo panel-mounted headphone jack.

Hand-selected Eminence loudspeaker for precisely defined music and voice.

The KDØZS R390A answers that nagging question in the back of your mind as you look through the ever larger and more glossy advertisments: "Are these things for real?"



For full details and pricing of this once-a-lifetime opportunity call Chuck Felton (KDØZS) at 307-322-5858, or email at: Feltondesign@yahoo.com web: FeltonDesign.com

WANTED: Collins promotional literature, catalogs and manuals for the period 1933-1993. Jim Stitzinger, WA3CEX, 23800 Via Irana, Valencia, CA 91355. 661-259-2011. FAX: 661-259-3830

WANTED: Any books featuring panel meters, gauges, or flight instruments. Chris Cross, POB 94, McConnell, IL 61050.

WANTED: JOHNSON RANGER CABS & or BEZELS. Or the whole cab set. Dee Almquist, W4PNT w4pnt@w4pnt.8k.com 540-249-3161 (msg). Cell: 540-480-7179 Virginia. Willing to trade.

WANTED: Add-A-Rack for "Bud Enclosed Relay Rack" (Not series 60 or 2000) Type AR-1778, Black (Newark #93F161 back then). Doc, KØGRM, ND, 701-258-6747 or write my callbook address, TNX!

WANTED: Coils Forms for National FB-7 and preselector. Mike Sanders, 18169 Hwy 174, MT Vernon, MO, k0az@arrl.net

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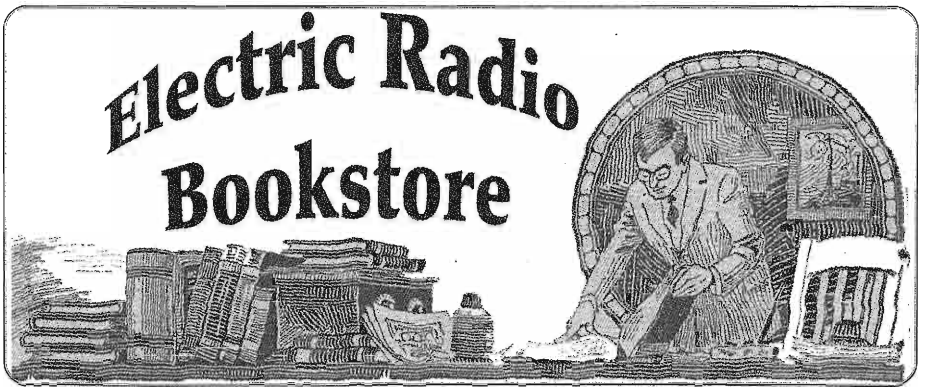

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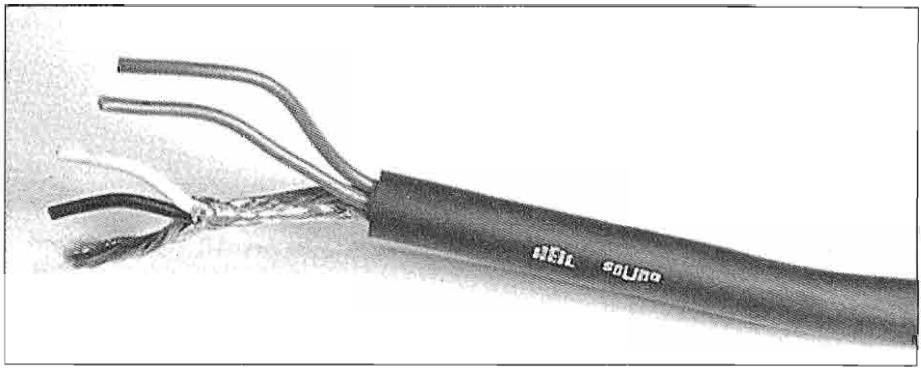

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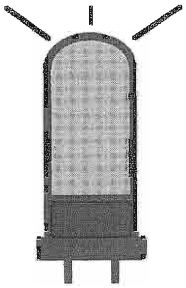

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