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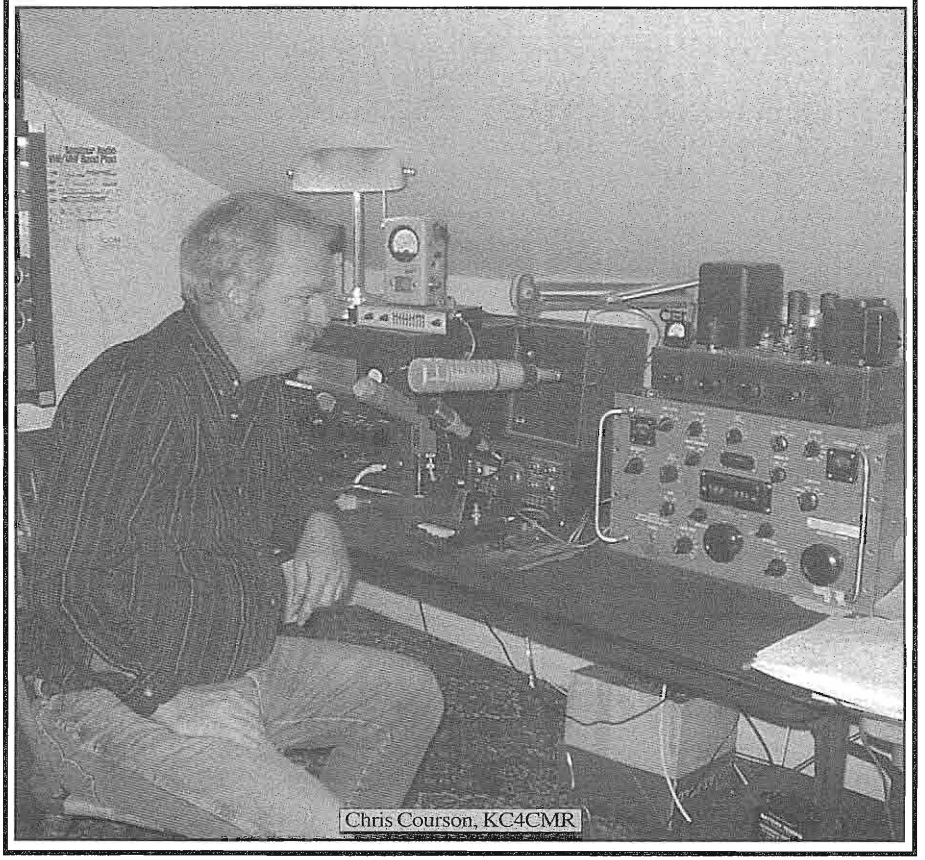
ELECTRIC RADIO

celebrating a bygone era

Number 165 February 2003



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Electric Radio was founded May 1989 by Barry Wiseman, N6CSW. The magazine continues publication primarily for those who appreciate vintage gear and those who are interested in the 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 and SSB are also needed. Photos of hams in their hamshacks are always appreciated. We invite those interested in writing for ER to write or call.

Regular contributors include:
Bob Dennison (W2HBE); Dale Gagnon (KWll); Chuck Teeters (W4MEW); Bruce Vaughan (NR5Q); Bob Grinder (K7AK); Jim Hanlon (W8KGI); Brian Harris (WA5UEK); Tom Marcellino (W3BYM); John Hruza (KBØOKU)

Editor's Comments

Early last month I was saddened to learn that Duane "Hoisy" Hoisington (W4CJL) became SK on January 11. Hoisy was Gary Taylor's (WB8BEM) Elmer, and Gary sent me a short biography that I would like to share with everyone:

"...He was almost 93 and was active until the last couple of months though not on the radio. His son had moved him and his wife to Florida where he lived. He was the founder of SPAM, an organization I had heard of prior to moving to Florence, Alabama but I didn't know I was to become so hooked on AM. He helped me with my first AM rig, a pair of 810's modulated by another pair. While he had "neighbor" problems with RFI, we prodded him and got him on the air some. Mostly after 10:00 PM on Fridays. We (myself and KN4ME, John) solved most of the RFI problems with a new antenna and working with the cable company, but he still refused to get on very often. When he did, the number of hams calling him, which remembered working him years ago, always amazed me. He was fond of 4-1000's and lamented to me just before his last move that he now had 4,000 watts of audio that he can no longer use. He did put out a big signal. He passed the torch of president of SPAM, on to Floyd who became a SM, then on to someone in California who seemed to disappear, and was looking for someone to continue it, but now it looks as SPAM has gone with him, but he was proud to be a member of AMI and the job Dale has done to promote AM. The AM in SPAM stood for Advanced Modulation not Amplitude Modulation. He promoted enhancing positive modulation while limiting negative, to compete better with SSB. Even in the later years he still offered information on this thru ads in ER for just the cost of copying and postage."

In March ER, I will be doing a biographical article on Hoisy. Anyone wishing to contribute their thoughts to this article should contact me at ER by the end of February.

A new issue has arisen in the AM community. It began when a number of long-time AM'ers requested that ARRL members who operate AM petition their respective Section Managers for an AM endorsement on the ARRL Worked All States award. The

[continued page 2...]

TABLE OF CONTENTS

COVER: Chris Courson (KC4CMR) at the mic. Chris uses a 32V3 fed with Shure RE20 audio thru a small EQ. Receive audio comes from his R-390A diode load fed into an Eico HF-20 PA that uses P-P 6L6's.

requests were sent along to the Membership Committee. There will be no AM endorsement at this time by the ARRL, but the subject would be open to further discussion. In addition, the use of 7290 kc for ARRL bulletins has been questioned as this is an AM calling frequency. These two issues have more to do with recognition of AM as a fast growing, viable, and important segment of Amateur Radio than they do with the specifics of the issues involved. I am asking everyone to write to their AMI Regional Director and express your views as soon as possible. As a group, we need to know if a WAS-AM award is something everyone is interested in, and also your feelings about SSB bulletins on 7290 are needed. This is an opportunity for all AM'ers to speak with one voice on these issues and to work constructively with our ARRL representatives.

It looks like near-record participation in AM operating activities over the 2002 holiday season! Bill (KDØHG) has reported the 1st place winner of the Heavy Metal Rally to be Steve (WB3HUZ). Second place was Dave (W3NP), and 3rd place was Gary (W2INR). Bill has 20 event logs total, with 700 entries in the logs. We plan to have the 1st place trophy and the certificates mailed out shortly. Jim (WAØFBQ) reported the best-ever turnout for the annual Santa Claus Watch. Mike Wells (WØFD) in Gunnison CO reports that the New Year's Day AMI group had 26 check-ins, with everything heard from a Desk Kilowatt to a DX-60, two Globe King 500s, homebrew 813s, a B&W 5100, Gates BC-19, and many more. Tom (KØQIG) in Montrose just got his Collins 20V3 on the air December 28th and was able to use it for the first time. KØOJ in Greeley reported that his Thanksgiving Day Bash was the best event since it started in 1995 with 61 check-ins and a great variety of equipment.

As mentioned in January ER, we are still planning on running the Electric Radio 1st Annual Dynamotor Night on March 1st. We'll see how it goes, and if there is enough interest the event will continue. After all, real radios have motors!

A Letter From Barry Wiseman:

Sadly, I have to report that the ER Photo Book project has been cancelled due to lack of interest. To date, after five months, I've received only 30 submissions for the book and that's a long way from the 500 I would need to make the project viable. Thanks again to all those who did send in photos and bios.

I've forwarded all of the material on to Ray for possible use in ER. Anyone who might not want their photos and bios used in ER should contact Ray.

73,
Barry, N6CSW

As a follow-up to Barry's letter, I would like to make the material submitted to-date into an ER column, to be printed as space permits in the coming months. Please let me know if anyone would rather not have the information used this way.

Please note that I am changing the deadline for classified ads. This will be posted every month in the Classified banner.

Keep those filaments lit!
73, NØDMS

Real Audio for AM, Part 2

Bill Kleronomos, KDØHG
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The last installment of this article covered the front end of a high fidelity, low distortion AM station— your microphone. Remembering the old adage, "Garbage in = Garbage out", it's very difficult to overcome the handicap of using a deficient mike no matter what sort of subsequent processing in the audio chain might be used.

Audio processing is an art form. There is no cookbook that'll tell you the precise types of equipment to use and the correct settings. Much like making chili, it's much a matter of individual taste and what ingredients are available. It's good to bear in mind one thing: The technical definition of distortion is that the output of an electronic device is not a replica of its input. Audio processing is deliberately introducing distortion on the signal; the art is to make that distortion sound both pleasing and intelligible.

You should begin with an idea of what your goals are. Do you want an open, "pin drop" sort of quality, or a blasting wall of audio? Do you want an intense audio effect, or do you want to sound laid back? Are you willing to accept more perceived distortion in order to squeeze out the last drop of loudness? One good way to start is to identify those stations that have sonic qualities that you like and then try to sound better.

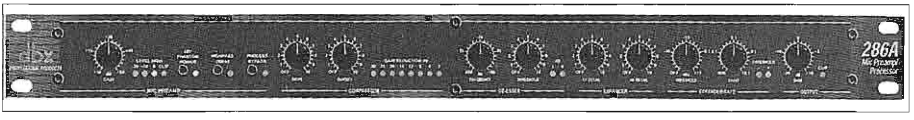
"Standard" equipment line-up

There is a specific order, or path, which is best followed in the audio chain feeding a transmitter. The order generally is:

- Microphone Preamp
- Compression
- EQ
- Clipping and filtering

The simple function of a preamp is to amplify the –30 to –60 dbm output of a typical broadcast mike to line levels of 0 dbm to +8 dbm. There are many preamps available on today's market at excellent prices. The usual attributes apply, most important are low noise and distortion. A simple balanced-input op-amp circuit can be homebrewed to provide the required gain of around 50 db. Lately, vacuum tubes have made a big comeback in mike preamps. It's hard to beat the sound of a 12AX7!

With their differential inputs and excellent common-mode noise rejection, op-amps are an excellent choice to use as preamps. In the past, their principle drawbacks have been high levels of hiss and noise as well as restricted frequency response in higher gain circuits. Don't use a 25-year-old 741! Much better choices are the more modern FET-input devices like the Texas Instruments TL-072. In my opinion, the Burr-Brown (B-B) series of op-amps are the best sounding devices out there. Their internal FET amplifiers mimic the transfer characteristics of vacuum tubes and they have distortion figures that were a dream not so long ago. I highly recommend the B-B OPA134/2134/4134 single/dual/quad amplifiers. They can also be used as a drop-in upgrade for older audio gear using lesser devices. They're available at



The DBX 286A mic preamp and processor, as discussed in the text, is a very capable and affordable unit with many advanced features.

suppliers like Digi-Key for around two bucks.

There are a few bargain mike preamps and processors out there, too. The DBX model 286-A is one. I think it's the Swiss army knife of economy microphone processors. This one rack-space high unit includes a preamp with switchable phantom-power for condenser mics, a compressor, high and low frequency EQ, expander and gating (essential for knocking back gain between words and reducing background noise). It also includes an insert jack for adding other audio accessories (like a reverb!). This wonder box retails for $299, but can be purchased at discount suppliers for prices as low as $185. I've seen them for less than $100 on Ebay as well. As I previously mentioned, your local musician's store can be your best friend when scrounging for this sort of pro audio gear. [Editor's note: 1 rack space = 1 ¾ inches in height]

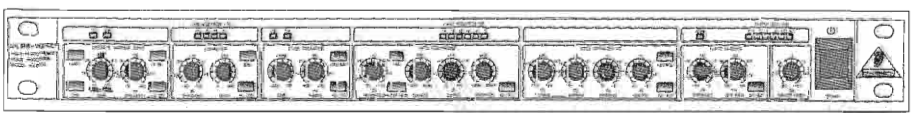
Compression

Audio compression is probably best defined as a form of automatic gain control with the goal of maintaining constant speech intensity over varying mike audio levels. That should be the main goal of any compressor stage. Speech compression has long been touted as a means of increasing punch and intelligibility, but the reality is that most compression schemes can offer only a db or two of perceived improvement in audio punch. Simple compressors used by hams usually have attack times of around 10 milliseconds and decay times of 300 milliseconds or longer. At 1 KHz, the middle of the voice spectrum, a cycle is only 1 millisecond; so traditional compressors are not fast enough to practically limit peaks.

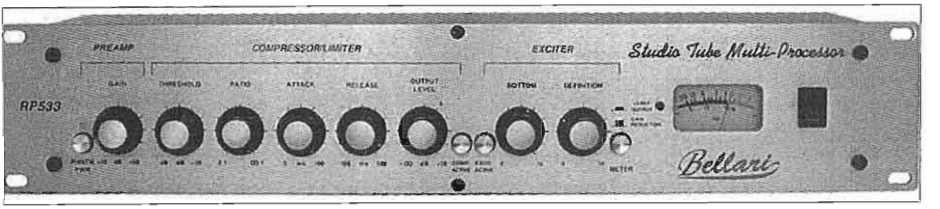
For our purposes, the dynamic range of the human voice is about 35 db but room acoustics and background noise limit the practical amount of compression we can use to 15 db or so. A very useful feature many modern compressors have what is called "gating". A simple compressor will run its gain up to the maximum between words and silent periods in normal speech, raising background noise and causing an unnatural 'breathing' effect.

Who hasn't heard those sideband stations that have so much room and blower noise in the background that their intelligibility is impaired? That's solely due to the simple compression action of the ALC incorporated into SSB equipment. By comparison, a *gated* compressor will recognize that audio inputs below a certain threshold are not to be boosted so those moments of silence pass through the system with the system gain reduced. The gate acts almost like the inverse of a compressor; its logic is, "If there's no audio, turn the gain *down*!"

As I mentioned, traditional compressors act to automatically "ride the gain" on speech, offering minimal improvements in loudness. By the use of a fully adjustable compressor and extremely fast attack times in the microsecond range, a compressor begins to cross a functional dividing line and begins to act as a speech clipper. Many people have instinctively presumed a direct relationship between loudness-punch and the amount of compression used. This is not as much of as factor as is the relationship between loud-



The Berringer VX2000 Ultra-Voice is another affordable mic processor with high performance. Among other features is an input "tube emulation" stage and discrete devices in the preamp for low distortion.



The Bellari RP533 is not inexpensive, but it is an advanced vacuum-tube based design that features a fully adjustable compressor/limiter with calibrated attack times from .5 to 100 ms. As with most of the professional models the release time is adjustable, as is the compressor level.

ness and a compressor's time constants. The faster your compressor acts, the more loudness it can provide. *To get louder, you don't turn up the gain on a compressor; you speed up its attack time.*

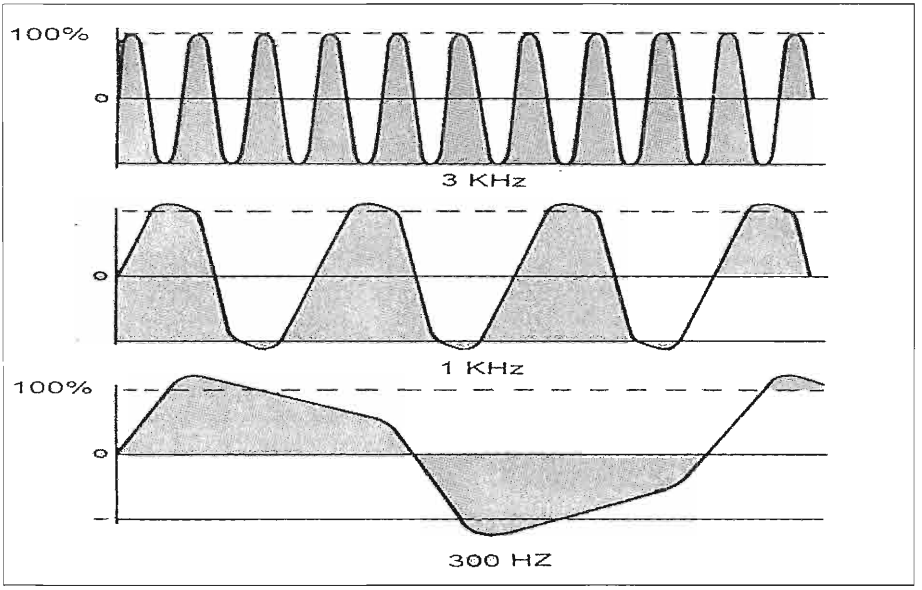
EQ

Equalization is an important factor in how a station sounds. Having a generally flat response, broadcast microphones can sound muddy when used without EQ tailored to the desired response. A bit of upper mid-range boost in the 1.5 to 2 KHz frequency band can help improve intelligibility and punch, but too much can give a station what I call "AM honk", or a nasal, 'cheap speaker' sort of sound. It's a dicey proposition to use too much EQ without following it with a speech clipper or peak limiter stage. With 6 db of mid-range pre-emphasis, for example, the mid-range will hit the audio stages and ALC on an SSB transmitter before the rest of the audio spectrum can, however, it is the lower frequencies that carry the bulk of the energy in speech and move the meters more. By the time someone turns up the mike gain so that there is a healthy amount of ALC or compression showing on the meter, there's a danger that the emphasized mid frequency components will have already gone into clipping and distortion because of their greater amplitude. This is something to be careful of when either dialing in EQ or using a microphone with any large degree of mid or upper range emphasis. You might gain punch and perceived loudness, but at the expense of generating clipping and distortion products in the transmitter's audio and RF stages.

Once again, there are always tradeoffs between loudness and distortion, and this one example how a "punchy" microphone or EQ can often end up sounding rather ratty.

CLIPPING, LIMITING and FILTERING

The final stage in any audio processing scheme should be a clipper-limiter, followed by high pass audio filtering. A clipper can be nothing fancier than a pair of diodes with adjustable biasing, and there's plenty of used equipment on the market at decent prices, such as the famous CBS Volumax series. Clipping is realistically the best way to improve a station's audio loudness- remove the audio signal's peaks and build up in a relative manner the effective level of the weaker sounds. Many consonant sounds such as s, t, k, b, v and l in human speech are up to 30 db down from the vowels, yet speech would severely lack intelligibility without those sounds being well articulated. Numerous tests have indicated that 6 db of audio clipping begins to become perceptible, 12 db of clipping adds significant loudness and levels up to 25 db are considered tolerable on speech. For that matter, it has been demonstrated that speech clipped 100%, without having any amplitude variations



The effect of phase shift and insufficient modulator low-frequency response which causes overmodulation and splatter is called "low frequency twist". These curves show how differing components passing through the same modulator are progressively distorted as their frequency is lowered.

at all is entirely intelligible. Clipping around 15 db doesn't sound *quite* natural, but it is not unpleasant to listen to. That's where I typically run the clipping level on my AM ham station.

There are a number of pitfalls to be aware of in the use of a clipper. First, clipping, by definition, is distorting the audio waveform. Distortion is the addition of harmonic energy to the fundamental. Clipping converts sine waves into modified square waves, and a square wave consists of the fundamental along with its odd-order harmonics- 3rd, 5th, 7th, 9th etc. Not only are these odd-order harmonics unpleasant to hear, but they also quickly exceed our desired frequency bandwidth without adding anything worthwhile. While you can filter everything above 3 KHz, for example, what about the distortion products generated by clipping say, a 150 Hz component? That crud will fall at 450, 750, 1050,1350 Hz and up, right in the middle of the speech audio spectrum. **That** certainly won't improve intelligibility!

This is one of the reasons why pioneers like Mike, KO6NM, developed multiband audio processing many years ago. The idea is to split audio into several bands, independently process and filter each band, then re-combine the processed and filtered audio. Even when found used, multiband processors like the Orbans are expensive, but they're the only way to achieve the ultimate in loudness, articulation and intelligibility by permitting higher levels of processing than could otherwise be effectively used.

In any case, regardless of the type of setup, a low-pass filter *must* be used after the final clipper-limiter or otherwise you're guaranteed to be broad as a barn on our bands. Hi-Fi AM is one thing, wastefully transmitting unintelligible distortion products across 15 KHZ or

more of the 75-meter band is another!

To be completely effective, the use of a clipper-filter before the audio driver stages of an AM transmitter requires that the phase shifts in the transmitter's modulator be kept to a minimum as the waveform gets "tilted" and can cause over modulation and splatter. While the real solution is to improve the LF response of the transmitter's audio stages, rolling off the bass response of the microphone by the use of the EQ to better match the bass response of the transmitter's modulator can minimize the problem.

The final clipper-limiter stage is where techniques such as asymmetrical modulation can be applied, where positive modulation peaks are accentuated to the limits of the modulator's power while the negative, splatter-causing peaks are held to –100% maximum. The CBS Volumax 4000, for example, has a front panel switch that adjusts the amount of asymmetry in the audio fed to the transmitter modulator. Many modern AM broadcast stations run positive peaks of around 125% to improve their signal-to-noise ratios. Experience has shown that even with unlimited modulator power available, the practical limit for asymmetry is around 125% on speech. Modulation percentages beyond that point can sound distorted on an AM envelope detector as there is insufficient carrier for proper detection. Signals sound marginally distorted like an SSB signal would with insufficient BFO injection on an older receiver. I have experimentally tried positive modulation percentages of up to 150% on a modern digitally-modulated AM broadcast transmitter and found the apparent loudness to be impressive, but with equally impressive amounts of distortion in the detected audio. Once again, the loudness vs. quality issue rears its ugly head. There's just no avoiding it!

There are several other ways of achieving asymmetrical modulation such as the use of negative cycle loading and the "Ultramodulation" circuit in a Class B modulator. Those subjects were previously covered in my article "A Legal Limit Modulator" back in July 1989, ER #3. Many of the audio purists among us do not accentuate positive modulation peaks, and admittedly doing so may add a slight degree of distortion. My own approach is a pragmatic one. If interference or noise is an issue, forget about the Hi-Fi and let the audio rip! There are few things more annoying than trying to copy an AM signal with a decent carrier but "PW" audio!

A whole book could be written on AM audio processing and equipment; admittedly I've only scratched the surface in this article but I need to end it somewhere. If there is an aspect to this subject that might be of general interest for a future article, contact the editor and ask!

The Restoration and Modification of my 75A-1
Part 2

by Bill Feldmann, N6PY
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In part one I described how to fix some common 75A-1 problems caused by the normal aging of components along with Bill Orr's modification to correct the greatest design fault in the 75A-1, a lack of sensitivity on the higher bands. In this part I'll describe some additional modifications I made to my 75A-1 that improves its performance while keeping it a hollow state radio. I'll also pass on a little additional information on repairing or restoring a 75A-1.

First, I have a few words about modifying older radios; "the question is to modify or not to modify"? To me it depends on the condition of the radio and how you are going to use it. It's really a personal decision only the owner can make. If I had a vintage Collins radio whose condition is a ten on the CCA rating scale along with its original manual, I wouldn't add any non-Collins approved modifications. A 75A-1 like this I would consider a collectable and probably not operate it very often. If I used it on ten meters, I would use an outboard RF preamp for better performance. However mine, like most of my radios, was not perfect when I bought it. I use it constantly and I want it to perform as well as possible with the least modification. I prefer to use modifications that use the components and technology of the time the radio was built, and I feel the designers would have included if given more development time.

If you ever sell the gear or want to trouble shoot it in the future, do a good job of documenting of your changes. I've found out the hard way that after a year or so I can't remember a change I've made. I never mark up an original manual. I prefer to make a copy of the schematic and any affected pages, then document the changes on the copies and keep them with the manual. I also keep a copy of any article describing modifications I've made in a folder with the manual.

If you are working on a 75A-1 with a low serial number, you may need a copy of the later schematic to understand the circuits in this article. After the first few hundred production 75A-1's, there was a major manual revision that came to my attention when trying to explain a 75A-1 repair to a friend. Looking at his early manual and schematic, I found the reference designators to be completely different than my later schematic and manual. All the circuits I talk about in this article were the same in his radio, but to understand any of the changes he needed the later schematic. His radio had a very low serial number, less than 200, while mine is 630.

Now let's continue on with some more improvements I made to my 75A-1. If your radio has Bill Orr's modifications it should work very well on all bands. However, I decided to see if I could further improve my 75A-1's signal to noise ratio along with keeping its S meter response closer to 6db per S unit, rather than the response after Bill's modifications. As shown in Figure 1, I replaced the RF amp tube, V1, with a much a higher transconductance 6CB6 to increase gain before the first mixer where it would improve the signal to noise ratio the most. I had to change R2 to 110 ohms ½ watt, as in Bill's modification. I changed R3 to a 39K ohm ½ watt resistor, and R4 to an 8.2K ohm 1 watt resistor. It's also

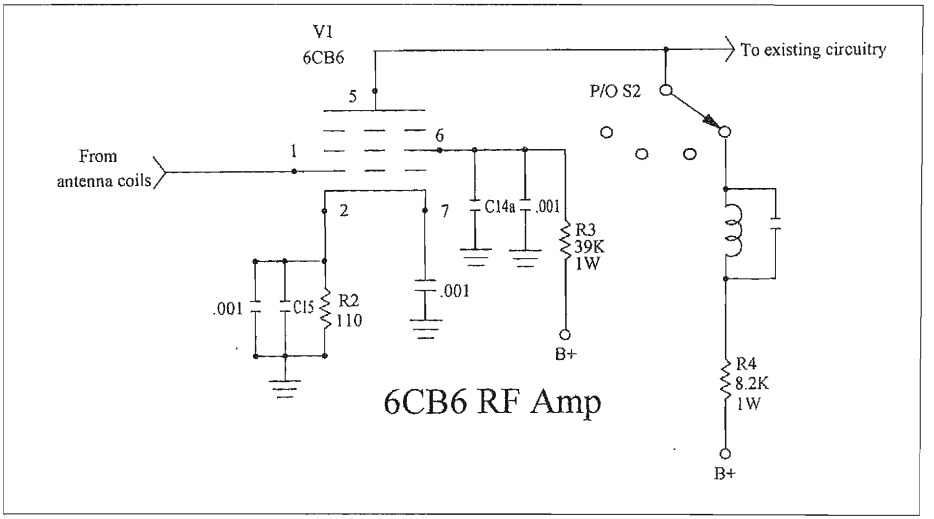

Figure 2: The low-noise 75A-1 RF amplifier stage that is rebuilt as described in the text using a 6CB6 pentode. This tube is easy to find and inexpensive.

necessary to add the .001 disc caps at pins 2, 7, and 6 of V1 as in Bill's modifications. These changes are shown in figure 1. This change results in the following cathode, screen and plate voltages with 137 volts of B+, AVC off, and RF gain fully CCW: (Vc=1.33V, Vs=132V, and Vp=155V).

However, after changing to the 6BA6 tube, the RF gain was so great it caused a decrease in the receiver's cross modulation resistance, caused by too much signal at the second mixer. To solve this I went back to the stock first IF tube, the original 6SK7 in V3. The receiver now had a lower noise floor than with the Bill Orr mod and the same cross modulation and resistance. Additionally, the S meter calibration is now much closer to 6 db per S unit with only slight scale compression on signals 30db over S9 or greater.

Another thing I didn't like about my 75A-1 was distortion of audio signals when using its noise limiter. Tom Bonomo, K6AD, told how to solve this problem in his second article in the November 1999 issue of Electric Radio. He discovered that the load resistors used in the stock 75A-1 noise limiter circuit were causing excessive audio clipping. He reduced the value of the 470K load resistors, R41 and R42, to minimize this distortion and still eliminate pulse noise, such as from power lines. I reduced these in my 75A-1 by installing 220K resistors in parallel with both load resistors. This greatly improved the audio with the limiter on and still almost completely eliminates noise from local streetlights and power lines. With the limiter on, I can now monitor my favorite 75 meter AM frequencies without noise but have no noticeable audio distortion when AM signals are heard. Tom also discussed design changes between the very early and later 75A-1's that corrected audio distortion. You should read Tom's article if your radio has a low serial number.

Tom's article also described an excellent method of adding threshold RF gain control to a 75A-1. I tried it on my 75A-1 and really liked the ability to reduce the receiver's RF gain to reduce noise and splatter when not receiving a signal but monitoring an AM frequency with the

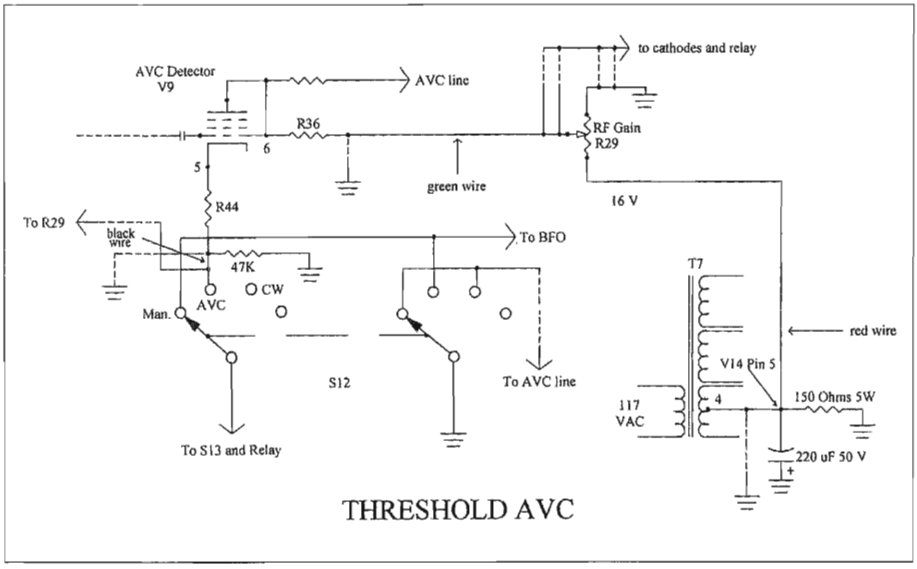

Figure 2: The complete N6PY threshold AVC circuit that has been developed for the 75A-1 receiver.

AVC on. Also the S meter will still accurately read the strength of signals above the threshold level set by the RF gain control. This feature was in all later Collins receivers starting with the 75A-2. However, I don't want to add components that were not available when a receiver was designed. I wanted it to still be a hollow state receiver. The problem was how to get a negative bias voltage to introduce into the AVC circuit without using diodes.

After a study of how the threshold gain control worked on later A line receivers, I came up with the idea of obtaining a negative 16 volt supply by installing a 150 ohm, 5 watt resistor in the ground return center tap lead of the power transformer, terminal 4 of T7. I moved the center tap wire that was grounded at V14's socket to the unused pin 5 of V14, and then soldered one lead of the 150 ohm resistor to pin 5 and the other resistor wire to an unused ground terminal on the tube socket. I also installed a 220uf, 50V cap in parallel with the resistor, its + lead going to ground to filter the supply. I next routed a red hookup wire from pin 5 on V14's socket to the unconnected end of R29, the RF gain control pot. I disconnect all the wires going to the other RF gain control terminals, soldered them together and insulated this connection from chassis ground so the receiver's standby relay circuit would function properly. Figure 2 shows the circuit changes I made to add threshold gain control.

I then introduced the adjustable gain control negative bias voltage, which can now be varied from 0 to –16 volts by R29, into the AVC circuit through R36, the 470K ground return resistor, which is connected to pin 6 of V9, the AVC detector. I disconnected the grounded end of R36 and connected it to an insulated standoff terminal I installed to a nearby tube socket screw. I then wired the terminal connected to R36 to the slider of R29, the RF gain control pot, using green hookup wire.

The RF gain control would now provide threshold control to the receiver's IF and RF gain when switch S12 was in the

AVC mode but not when in MAN or CW. To solve this, I disconnecting the wire that goes to the jumper between two terminals that grounds this wire when in CW and MAN. Then, on the second section of S12 that shorts the RF gain control pot slider in AVC and deactivates the BFO when in MAN, I disconnected the wire coming from R29 from the AVC terminal of S12. I also insulated the ends of all the disconnected wires. I next soldered a black hookup wire to the now free AVC terminal of S12 and routed the wire to the vicinity of R44, the 2.2K resistor connected from ground to pin 5 of the V9. It's located on the vertical board next to the second IF. I unsoldered the grounded end of R44 from its terminal and soldered a 47K, ½ watt resistor between the ground terminal and the now unsoldered end of R44. I then soldered the end of the black wire I routed from S12 to the junction of the added 47K resistor and R44. The 47K resistor will now provide self-biasing of the cathode of V9 when in the CW and MAN modes to disable the AVC detector circuit. When in AVC, the detector circuit will function when S12 grounds the junction of the two resistors.

My 75A-1 now had threshold RF gain control when in the MAN, AVC or CW modes. An advantage of the added 47K resistor between R44 and ground is that if you are listening to a weak signal in the CW or MAN modes and a much stronger signal comes on, the 47K resistor will then conduct sufficiently to give some AVC protecting your hearing. Another feature is that the RF gain control is easier to adjust than on my other Collins receivers because it now takes nearly a full CCW rotation of the RF gain control, R29, to completely cut off the receiver's gain. A small price paid for my method of obtaining a bias supply was a drop in B+ voltage to 226 volts from 237 volts. I find this small voltage drop had no effect on my 75A-1's performance.

Now I'm going to describe a few additional things that may help you when working on a 75A-1. When aligning the RF and first IF sections it's necessary to have the bottom cover installed over the RF and IF circuits. With it not installed I have found my 75A-1 will have a tendency to oscillate on the higher bands, especially 10 meters. This will be noticed by a hissing sound in the speaker and an increase in S meter reading with no signal at the antenna input when tuning over a part of a band. It's caused by feedback between the high Q circuits of the IF and RF sections. This radio should be aligned with only the top cover removed to have access to the necessary coils and trimmers. If your radio is missing one or both covers, you can have replacements made by Wayne Spring, W6IRD, at 714-639-3982.

While we are talking about alignment, I found one procedure confusing. In the manual it stresses that you always align the tuned circuits by adjusting inductors at the low frequency end and capacitors at the high frequency end. When adjusting my PTO's tracking to correct a 3 kc error over the 40 meter band the error got worse when I attempted to correct it. Then I dawned on me that the PTO is going down in frequency as you tune the receiver up in frequency because of the way signals are converted. I then reversed my procedure; I adjusted the PTO's capacitor, C003, at the lowest dial frequency and adjusted the PTO inductor by loosening the coupling between the PTO and dial. At the high dial reading and I was able to reduce the error to less than 200 cycles.

The stock 75A-1 has acceptable AM communication audio but it's not outstanding. The Bill Orr's modification, outlined in part 1, improved the A1's audio considerably but mine still lacked the audio of my 75A-4 with a 6 kc filter. Higher audio frequencies were being slightly suppressed. I noticed when I tuned across a carrier the signal started to fall on the S meter about a 1.5 kc each

side of zero beat giving only a 3 kc flat band pass. To improve this I tried the trick of stager tuning the second 500 kc IF transformers. I deviated from the manual's method of second IF alignment for peaking T3 and T4. I set my signal generator for 2 kc above the peak frequency of the crystal filter to tune the primaries of both transformers, and 2 kc below for each transformer's secondary. I then adjusted T1 to get as flat a band pass as possible 2.5 kc either side of the crystal filter peak frequency. I also found I could do a much better job of alignment by turning off the receiver's AVC and detecting the IF signal with my voltmeter across R41, the detector's diode load resistor. After this procedure I noticed the S meter indicated a nearly flat band of response 2.5 kc either side of zero beat of a carrier, a flat 5 kc bandwidth, and the audio was now as good or slightly better than my 75A4 using its 6 kc filter. My A4's audio with an 8 kc R390A filter is still better. The slight stager tuning of the IF didn't seem to appreciable hurt the skirt selectivity for signal at least 5 kc off frequency. You may want to try this on your 75A-1 if you have the Bill Orr modifications installed. Without the higher IF gain of Bill's modifications, you may loose too much signal by stagger tuning.

For pleasant AM audio I use a high quality flat response speaker with my 75A-1. I have the 75A-1's stock 270G-1 speaker enclosure, but I replaced its speaker with a Jensen Vintage, 8-inch, 4 ohm model available from Antique Electronics at 480-820-5411. My experience with Collins speakers is they are fine for communications quality, but a higher quality speaker is much more enjoyable to my ears even when listening to SSB.

If you remove the radio's front panel be very careful not to damage the numbers silk screened on to the exterior glass of slide rule dial. The numbers will dissolve if any attempt is made to clean the glass with water or chemical cleaners. Don't even rub on them with a dry cloth, but only dust the panel with a soft brush. Keep your fingers off the glass because fingerprints are nearly impossible to remove without damaging the panel. If the numbers are damaged, one of the Collins Store sources at www.collinsradio.org can sell you a plastic sheet with numbers that can be installed between the dial glass and light pipes in the dial.

If your 75A-1 has a broken or cracked dial or front panel glass you can easily find a replacement by making an exact paper pattern of the glass and going to a glass dealer. They can cut the glass panel from a sheet of 3/32-inch single strength glass. If the dealer doesn't stock this thin glass, go to a store selling cheap picture frames. Buy one and cut out a replacement panel from its 3/32-inch glass.

There are many good ways to clean a 75A-1 if yours has grime and dirt in or on it. I've used a "Simple Green" solution, 25% in water, with excellent results for years. For really dirty areas I sometime go to a 50% solution but not on painted surfaces. For very dirty areas I scrub them with a soft brush after applying the solution. However, be careful, these types of cleaners are slightly acidic. After applying this solution be sure to completely rinse it off metal or painted surfaces using lots of water. Keep it off and out of meters, IF transformers, trimmer capacitors and the slide rule dial. These I remove or mask off before cleaning. Around trimmer caps you can spot clean using ammonia or "Windex". On Collins A-line painted or silk-screened panels, I've never had any problems with "Simple Green". I try to do my cleaning on 80F, or warmer, low humidity days and allow the radio to dry for at least 48 hours before applying power. Then I bring it up slowly using my VARIAC. On "A" line cabinets and silk-screened front panels that are faded because of oxidation, I've had good results restoring them by wiping with a soft cloth soaked in "Armor All". After it soaks in I wipe off any

excess solution so as to not attract dirt. A badly faded 75A-3 cabinet, which I almost had repainted, came back like new using "Armor All". However, with all solutions use caution, and test before using them.

I've had excellent luck cleaning dirty switch contacts using "Deoxit5" but I use it sparingly and with care. On non-ceramic wafer switches, I only dab it on the contacts using a Q-tip or their new pen applicator. After using it on switches and relay contacts, they seem work fine for years. Also keep it well away from trimmer caps, I had a big problem once when some wicked into a 75S-3 trimmer. Don't use it on carbon or composition pots because it can attack the composition conductors. For these I use the milder "Radio Shack" cleaner and tuner lube. However it works great on dirty wire-wound pots. For shaft bearings I use a little oil or silicon grease. There are lots of other ways to clean and lubricate but the above methods have worked well for me.

I finished off this project by making my receiver look as good as it worked by sending the cabinet and front panel off to Howard Mills, W9HM, at 304-876-6483, for powder coating and silk screening. Both my cabinet and front panel had some holes left from previous modifications that also needed to be filled. Howard did an outstanding job on my panel and cabinet and I highly recommend his work. Additionally, Howard does complete 75A-1 restorations, and also installs a modification similar to Bill Orr's for good ten-meter performance.

If a cabinet and front panel needs complete refinishing, I prefer powder coating to painting for its durability, but it does have some disadvantages. It must be applied properly to obtain a good match to the original Collins texture. Additionally, the black powder coat is slightly darker than the stock Collins St. James gray. A solution is to apply a very light fog coat of St. James gray over the powder coat to match the original color. Fortunately my 75A-1 sits next to my 32V-3, whose cabinet was powder coated by a previous owner, so they match.

In conclusion, I hope this two-part article has been educational and helped you know a little more about the Collins 75A-1 receiver. Some of the modifications I have done to mine you may not want to do. I use my 75A-1 often and want it to be a good working receiver for my purposes. I almost always use it as a net control operator on the CCA 10 meter AM net. I like its ability to rapidly tune a band to find AM signals as compared to the slower tuning or my 75A-4 or R390 receivers. While it doesn't have the skirt selectivity of my 75A-4, it beats my 75A-4 and my other AM receivers for dial accuracy and repeatability when switching bands. I don't have to fuss with changing the dial setting because the LO crystals can be aligned using their trimmer caps, unlike later A-line receiver. Even if you didn't agree with some of my changes, I hope you found this two-part article informative.

ER

The KD6OS High-Powered Mobile Station

by David Olsen, W6PSS
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w6pss@aol.com

When's the last time you considered going MOBILE? How many remember George Mouridian's (W1GAC) articles on his "Mighty Mo" – a midget mobile transmitter he wrote about in the 50s? Indeed stories of mobile and portable radios are both fascinating and intriguing! It becomes even more interesting if associated antennas are included.

There's a mystique in operating mobile that has no parallel – regardless of your choice of emission. Imagine being far off in the Chagos Islands of the Indian Ocean, running 100-watts Maritime Mobile, and talking with friends 10 thousand miles away. The author, thenVQ9PS, enjoyed doing so & spoke to friends at Ham Radio Outlet, San Diego in 1992 via phone-patch.

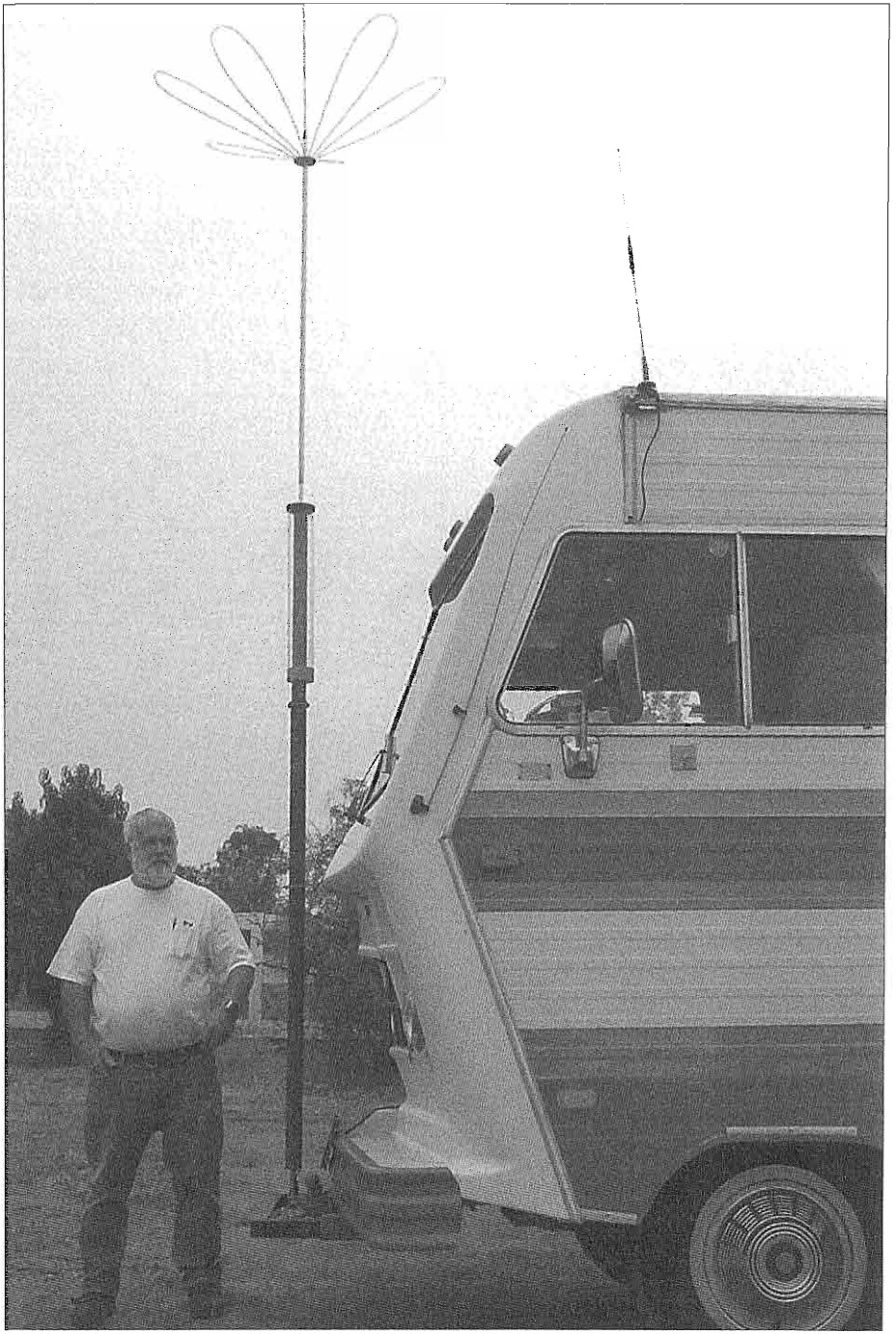
If you haven't tried mobile, you too are in for some delightful times. Another great mobile experience occurred last October 18th when we were visited by the Millers, Ralph (KD6OS) and XYL Pat (KA6PLH). What was to occur turned our heads on the meaning of the word mobile! As these two vagabonds emerged from their Explorer motor home, we were soon given a tour of their high-powered mobile station. We're not talking 1kW (PEP), we're talking full legal limit 160 thru 10 meters.

After getting reacquainted, Ralph produced a daily schedule sheet listing numerous stations he planed to work on 8 different frequencies on 5 different bands from California to the Midwest & points beyond! Although the plan appeared ambitious, all doubt was removed noting the equipment onboard. That arsenal includes an older IC-730 transceiver, a brand-new FT-920 with associated "killer" SIGMA 3000D linear capable of dimming house lights. An onboard 4-½ kilowatt gasoline generator, housed in its own quiet compartment, provides what the linear needs – JUICE!

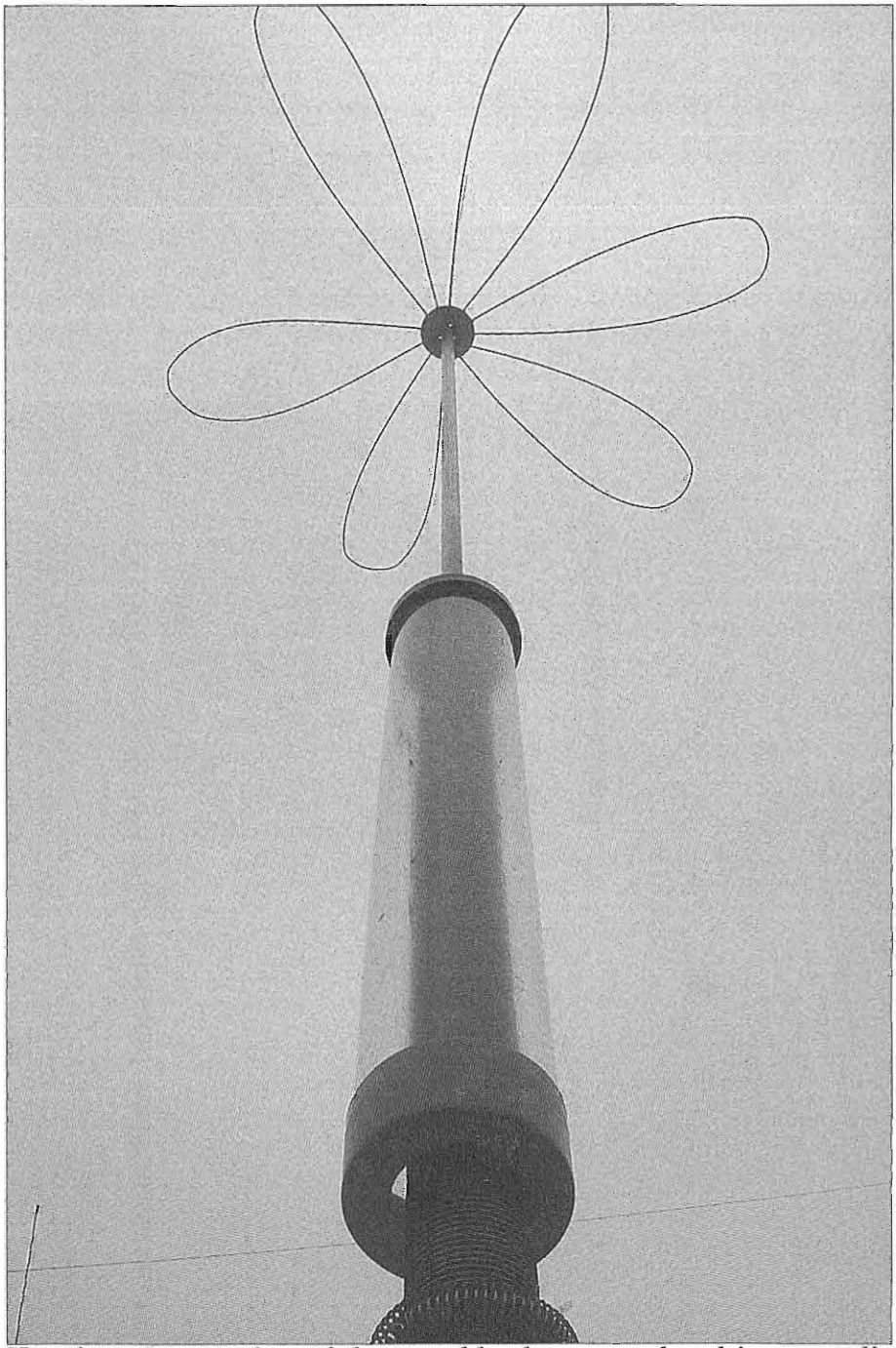
Next, Ralph proudly demonstrated his ultra efficient HF Screwdriver Antenna that he fabricated using a proven design he credits to premier AM/SSB mobile operator Bob Sitterley (K7POF). This antenna is a quantum leap forward from the efficient mobile antennas observed on Bob's pickup truck in the 80s. Those days, K7POF's mobile signal was comparable to a fixed station as he traveled between Arizona and his old California QTH.

The name Screwdriver Antenna is a misnomer. As Ralph described, the name originates from the fact that an actual dc motor from a portable screwdriver is utilized to turn the center loaded antenna inductor. The jaws of its chuck attach to an insulated portion of the lower mast section and remain secure with the insertion of a cotter pin. According to Ralph, "This design may be superior, in some ways, to the commercial ones." Ralph proudly described how he used his lathe to cut grooves in the large diameter PVC coil form to snugly accommodate the wire. You may wish to contact Ralph yourself for further information on construction details.

The Screwdriver Antenna utilizes an efficient and adjustable center-loading coil, the inductance of which is remotely controlled from the operating position as the operator seeks the lowest SWR while injecting minimal RF tune-up power. A future upgrade may include passive tune-up. The control is a simple forward/re-



KD6OS stands next to his homebrew mobile antenna, which is designed for the full legal limit on all HF bands.



Here is a closeup view of the tuneable element enclosed in an acrylic housing. The drive mechanism makes use of a cordless screwdriver.

verse switch that selects appropriate battery polarity for the powerful electric screwdriver motor. The attached shaft passes through a threaded post that moves the loading coil such that it slides up or down until desired VSWR attained at resonance (see close up photo). A spring loaded metal collar encircles the coil, ensuring discontinuity free contact for its "electrical tap." The coil assembly passes up & down inside a clear Lucite cylinder that provides protection from the elements.

There's no mystery to the theory behind this antenna. What is unique is the mechanical/electrical configuration of its center-loading coil. For those desiring an in-depth review of basic quarter-wave antennas, your attention is invited to ARRL's Antenna Book, 1970, p. 292; ARRL's Mobile Manual, 1955, p.268 and R. Johnson & Henry Jasik's Antenna Engineering Handbook, 1961/84, pp.6-1 to 6-17.

Basically, quarter wave antennas like the standard 8' 10-meter whip, exhibit nearly zero reactance and pure resistance at resonance. But at frequencies below resonance, the same antenna will exhibit progressively higher capacitive reactance and a decreasing radiation resistance. This combination limits current flow through the radiator. This problem is resolved by introducing an equal inductive reactance, or a coil with proper inductance, to bring the system into resonance. The convention has been to accomplish this by using separate loading coils for each amateur band.

Whether to use base, center, or top loading is a matter of preference. But the serious "mobiler" has long known he could double radiation resistance markedly at lower frequencies by using center loading. At the center, inductive reactance increases at a faster rate than the internal resistance of the larger coil required, and an ideal high Q is achieved. Indeed, a factor in minimizing losses, noting that the best of loaded whips have efficiencies less than 20-percent with averages of, perhaps, 13.

Many may recall the Webster Band Spanner and VAARCO's coil mobile antennas. Both were mechanically adjusted to predetermined-calibrated settings corresponding to particular bands and each had its unique scheme to arrive at the setting. Although Ralph's Screwdriver may not exceed by much the efficiencies of the best manually adjustable models of the past, it removes the drudgery of stopping to change bands.

To conclude, Ralph & Pat made it safely to their Oklahoma destination without a hitch – well, they did have Pat's VW in tow – hi! The highlight of their journey was visiting with K7POF in Arizona and visiting the giant annual swap meet at Tucson. The KD6OS Mobile Message Center reported more about who was there than who got what. It was a good time for the Miller's and those privileged by their visit. There was always hot coffee in the pot!

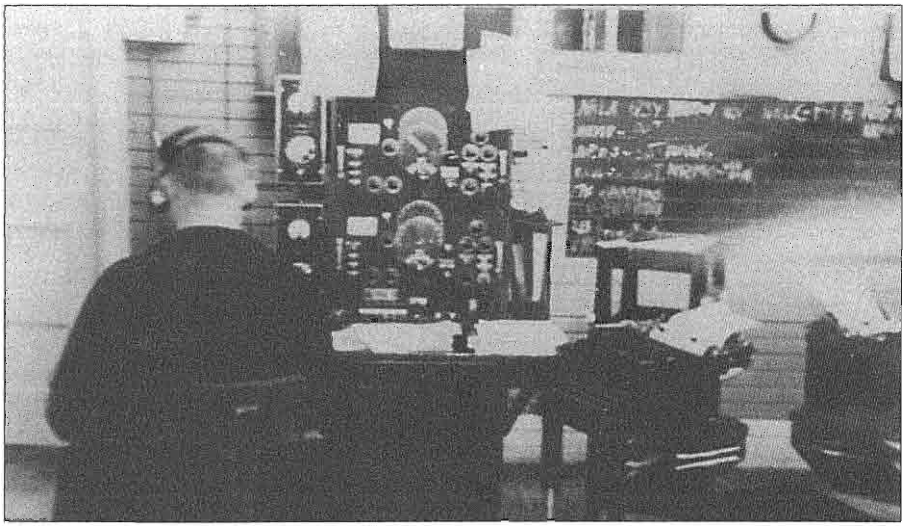
Thanks for education on MOBYLE Ralph. You demonstrated that nightly 160-meter mobile contacts beyond a thousand miles were no problem using your homebrew screwdriver system with the additional capacity hat of your design. During your marathon you were heard on 1863, 3992, 7278, 7282, 14286 & 18153 kilocycles SSB & AM.

For those who remember "The Mighty Moe," George Mouridian is alive and well. Although in his late 80's, George continues to enjoy ballroom dancing and the company of pretty ladies!

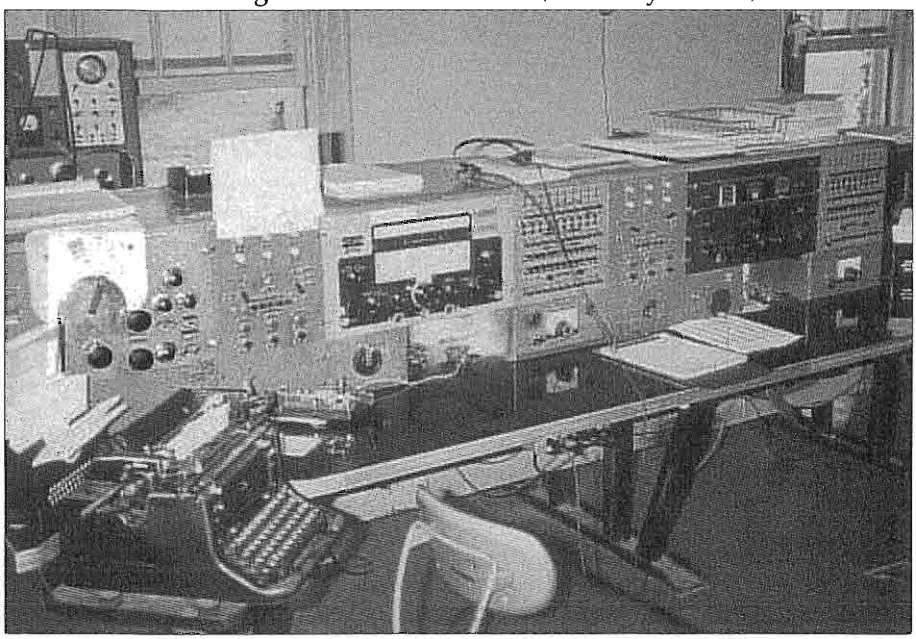
Well, are you thinking about going MOBILE? Why not give it a chance, it's guaranteed to produce hours of pleasure & delight. Ralph & Pat returned to Bell Gardens in December but have already been heard on the road again in Central California. You may contact Ralph at kd6os@attbi.com. Think Mobile, you'll be delighted.

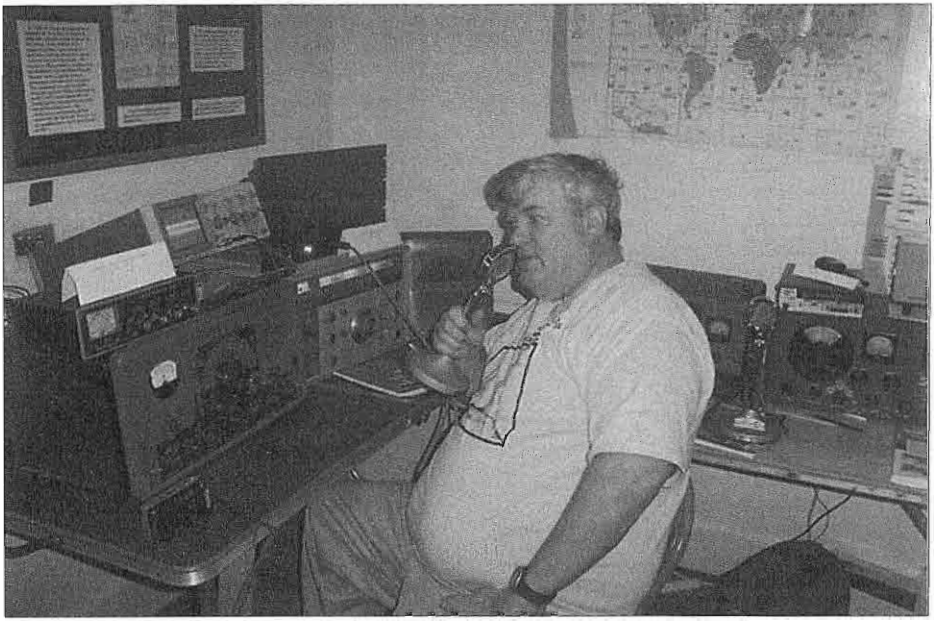
ER

Contributor's Photo Album



More RCA AR-60 photos have turned up. The scene above was taken before 1942 at the Rockaway, New York primary Coast Guard station and the AR60's clearly show above the operator's shoulder. (Courtesy W2OQI and W1TG). Shown below is the WCC console at Chatham, Massachusets. One AR-60 is visible over the mill, and a rare Marconi Atalanta is in the center. To the far right is an RCA AR-88. (Courtesy N1LIS)





Bob Callahan (W1QWT) ran a vintage AM station in connection with the Marconi Radio Club January 11-19, 2003. The group completed over 12,000 QSO's and transmitted a 1903 greeting from President Theodore Roosevelt to King Edward III. This was followed by a special message from President Bush to commemorate the event. Bob is planning an ER article about this unique event in a future issue. (Photo courtesy W1QWT)

A step back in time takes us to the home of Benjamin Meissner in early 1930. Mr. Meissner is shown in his laboratory working on some diagrams, with boxes of radio parts and euipment ready for a project. This was taken well before his amateur product line. (From May 1930 Radio News)

Life After the D-104

by Bob Peters, K1JNN/5
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I, for one, was disturbed to find that ASTATIC would not be manufacturing the good old D104 or, as many of us know it, the lollipop mike. This mike came to ham radio in the 1930s and was probably the most popular mike in ham radio. If you look at a photo of almost any shack, you will find a D104.

When I learned that Astatic would be manufacturing the D104 Final Edition I had to have one. It arrived by Santa on Christmas Day of 2001, the final never-to-be-made-again classic microphone. While surfing the Web the other day guess what I found? A look-alike D104 made by Workman Electronic Products of Ohio. Does it look like a D104? Not really. It appears that Astatic must have had a copyright on the old lollipop since the replica of the original D104 is an octagon. It is called the Silver Salute (please see photo), and it sounds every bit as good as the old lollipop.

The Silver Salute microphone, currently produced by Workman Products.

This mike comes with a 4-pin connector as used on older Yaesu and Kenwood mikes. Specifications say 600-ohm impedance, but it works great on the Globe King and the Ranger II with no matching transformer needed. According to Workman, you need to use the amplifier built into the mike since it is part of the equalization curve. This same statement came from Astatic for the D104. Using the amplifier is no different than running some EQ, and we all do that on AM anyway. The amplifier is not there as a CB thing, as I have heard many hams say. Everyone I have talked with says it sounds as good as the good old lollipop. One more fantastic feature is that you can take the head off the stand and use it on your old G Stand if you want, or you can use the Workman stand for your old D104 ...10DA ... or 10C.

I had never heard of Workman before locating them on the Web, but the company distributes a lot of ham radio products and is adding to its product line all the time. See http://www.wep4cb.com for the complete product line. The company sells wholesale only, so contact your favorite dealers for retail sales. According to Workman, dealers such as AES, WB0W, and RS&L carry this mike. Look forward to hearing more of these on the air.

ER

VINTAGE NETS

Nets that are underlined are either new, or have changed times or frequencies since the last issue.

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)

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

Boatanchors CW Group: 3546.5, 7050, 7147, 10120, 14050 Kc. Check 80 on winter nights, 40 on summer nights, 20 and 30 meters daytime. Nightly informal net usually meets around 0200-0400 UTC. Listen for stations calling "CQ BA" or "CQ GB".

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

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: Saturday afternoon 3745 Kc 3:00 PM EST.

Collins Collectors Association Nets: Technical/swap sessions meet every Sunday on 14.263 Mc at 2000Z. Informal nets Tuesday evening 3805 Kc 2100 ET, Thurs 3875 Kc. West Coast 75 M net 3895 at 2000 Pacific time.

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 (WB0IQK).

Drake Users Net: 3865 Kc, Tuesday nights at PM Eastern Time. Net controls 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 Jim (N8LUV), with alternates. The net is all about 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 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).

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 20 years. It starts at 5:00 PM Pacific Time and goes for about 2 hours.

Midwest Classic Radio Net: Saturday morn 3885 Kc 7:30 AM, CT. Only AM checkins. Swap and sale, hamfest info, and technical help. Control op is Rob (WA9ZTY).

MOKAM AM'ers 1500Z Mon thru Fri on 3885 kc. A ragchew net for 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 10 AM local time 3945 Kc in New England area. Net hosts George (W1GAC) and Paul (W1ECO).

Southeast Swap Net: Tuesday 7:30 PM Eastern Time 3885 Kc. Net controls Andy (WA4KCY) and Sam (KF4TXQ). Group also meets Sun on 3885 Kc 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 Sunday at 4 PM Central Time 14.250 Mc. Net control op Dean (WA9AZK). Technical Net Sat, 7235 kc, 1900Z. Net control is Stu (K4BOV)

Westcoast Military Radio Collectors Net: Meets Sat 2130 Pacific Time 3980 Kc +/- QRM. Net control op is Dennis (W7QHO).

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

A Dow-Key and Potter & Brumfield Story

by Tom Marcellino, W3BYM
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This is a story about the infamous Dow-Key coaxial relay and the poor man's substitute, a standard 10 ampere DPDT Potter & Brumfield. My relay of choice for antenna switching has been the P & B for many years. Some time back I found a Dow-Key DK60 series coaxial relay. At the time the thought was to save it and incorporate it into the Big Rig project - see Electric Radio for February, March, and April of 2002.

Well, remember the thought was to install it into the project, but after reading this article you too may think otherwise. Oh, not to say anything negative about Dow-Key relays in general, but in my particular case this model was a poor choice. This relay was designated DK60-G2C. This meant it had the following: a SPDT RF switch with DPDT external contacts and a special "isolation connector" in the de-energized position. Looking casually at the unit did not reveal the isolation connector.

This fact wasn't revealed until after it was firmly mounted and wired to the cabinet of the Big Rig. Problems started with the receive signal and the constant changing of the signal strength as indicated by the carrier level meter. Of course, I never suspected the Dow-Key, and directed my attention to some problem with the R390A that was in use. It didn't take long to discover the receiver wasn't the culprit and it became apparent the signal strength was directly related to the size of 2x4 used to rap on the side of the Dow-Key.

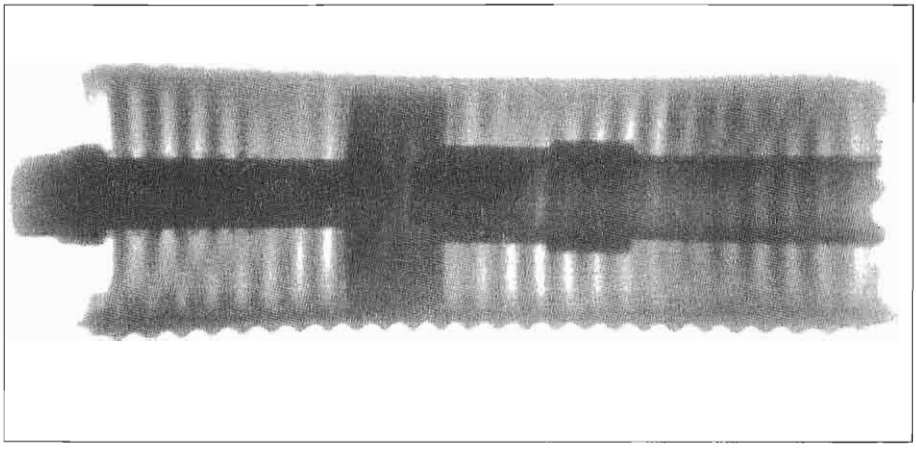


Figure 1: This is an X-Ray micrograph of the Dow-Key transmit barrel that clearly shows the continuous length of the moveable contact piece on the left. In the center is the gap that is closed when the relay operates, and the fixed portion of the female SO-239 shows on the right side.

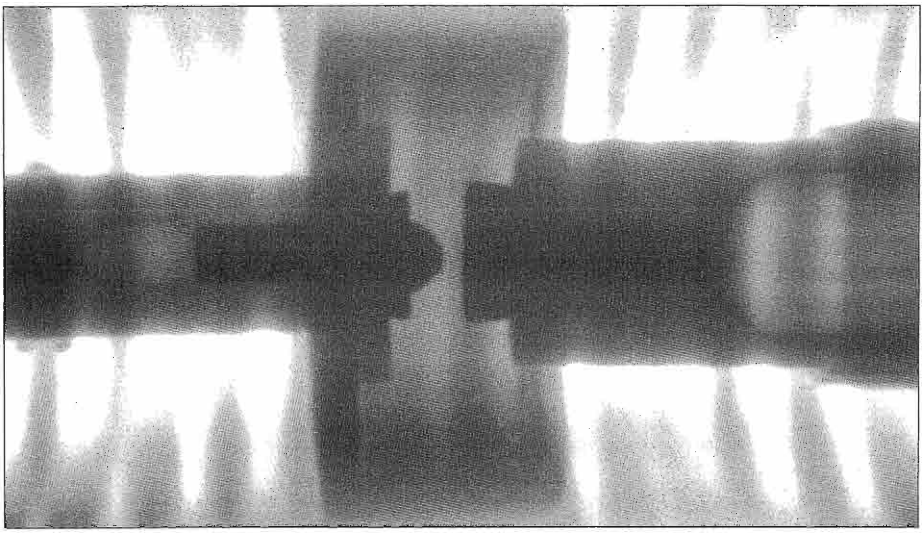


Figure 2: The extra contact is visible in this X-Ray view just to the left of the gap in the center. The problem with this design is that the extra contact is nearly impossible to clean, and is responsible for the relay's intermittant operation.

What happened next was the complete removal and disassembly of the relay. The internal contact spacing was ok and the contacts were clean, but they were cleaned again. Figuring there was nothing further to do with the relay, it was again re-installed only to find the problem was still there.

Therefore, you guessed it; I pulled it off again and went to the workbench. This time note was taken of the difference in barrel length between receive and transmit sides. I thought this was interesting but it still didn't dawn on me why these lengths were different. Further inspecting the contacts with both barrels removed, I noticed the transmit side used a fixed contact and the receive side used a spring-loaded contact. Hence the receive side was longer to house the isolation connector. So what is an isolation connector you ask? Not a big deal. It's just an additional set of contacts.

With the assistance of an X-ray system, diagnosing the internal parts of the barrels was greatly enhanced. Inspection of the transmit barrel (figure 1) showed a continuous solid connection between the internal contact and the female connection within the SO-239. Inspection of the receive side was very different.

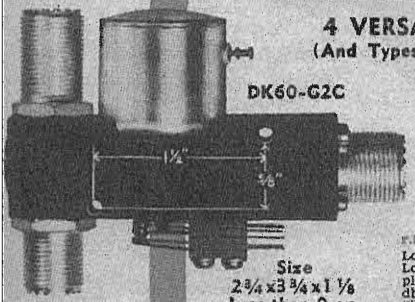
As shown in the X-ray micrograph, Figure 2, one additional contact (connector) was evident. Mentioned earlier was the fact the contact for this barrel was spring loaded, so a fair question would be "where's the spring?" You will have to take my word on this one that the spring is really there. The reason it isn't visible in the micrograph is the fact the X-ray electron beam level must be high enough to penetrate the silver plated brass SO-239 barrel. In this case, we are speaking of several thousand volts. In doing this the extremely small spring is just "washed" out because it doesn't have enough density to absorb the beam. It should also be pointed out that due to X-ray magnification, the micrograph is approximately 10 times the actual barrel

DOW-KEY GUARANTEED

UNCONDITIONAL GUARANTEE
(We will repair if faulty within 1 year)

DK60 SERIES
COAXIAL RELAYS

4 VERSATILE MODELS, A.C. or D.C.
(And Types C, TNC, BNC, N, UHF Connectors)



Size
2¾ x 3¾ x 1⅛
Less than 9 oz.

★ All Relays in weatherproof boxes for exterior installation.

★ Ganged, multiple position switch arrangement available for remote control selection of antennas.

STANDARD RELAYS WITH TYPE UHF CONNECTORS INCLUDE:

- DK60—SPDT r.f. switch.
- DK60-G—SPDT r.f. switch with special "isolation" connector in de-energized position.
- DK60-2C—SPDT r.f. switch with DPDT auxiliary contacts.
- DK60-G2C—SPDT r.f. switch with DPDT auxiliary contacts and special "isolation" connector in de-energized position.

DK60 SERIES from $12.45

R.F. SPECIFICATIONS:

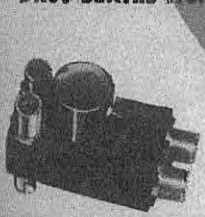
Low VSWR: less than 1.15:1 from 0 to 500 mc. Low Losses: Pure silver contacts. Parts in crucial positions plated with fine silver. Low Cross-Talk: (greater than 80 db) in DK60-G and DK60-G2C through use of patented "isolated connector" (in energized position). High Power Rating: (a) 1 kw through straight connectors (b) to 10w through "isolated connector" — excellent for video switching. SPDT r.f. Contacts: r.f. leakage extremely low, below typical r.f. connectors.

MECHANICAL SPECIFICATIONS:

High Contact Pressures: Long life expectancy greater than 1 million operations. Continuous Duty: Teflon feed-through terminals used on coil to provide connection ease.

ELECTRICAL SPECIFICATIONS:

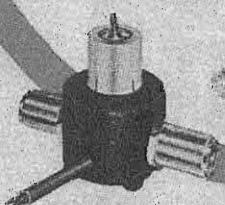
Wide Variety of Coil Voltages: 6,12,24,32,48,110,220 D.C. coils at 2.0 watts; 6,12,24,110,220 A.C. volts at 5 volt-amps, 50-60 cps. (Special voltage or resistance available on request.) Less Than 50°C Temperature Rise Above Ambient: Maximum operating temperature is 100°C except on special order. Auxiliary contacts available for power control — DPDT at 5a. 110 v A.C. on DK60-2C and DK60-G2C.



DOW-KEY NEW DK2-60 DPDT r.f. SWITCH

For switching two coaxial lines simultaneously. Specifications similar to DK60 series.

DK2-60 ea. $19.00



DOW-KEY RFB PREAMPLIFIER

50 to 70 ohm impedance matching "broadband preamplifier." Increases over-all gain by 1 to 6 "S" units on all bands (1.5 to 30 mc.). 1-⅛" x 1-⅜" x 2-¼". Wt. 10 oz. Brings up weak signals!

RFB ea. $10.75

DKC-TRP COAXIAL ELECTRONIC TR SWITCH

Operates in 1.8 to 30 mc. range. 120 v. A.C. Low VSWR. TVI proof, rated maximum legal power.

DKC-TRP $27.75

DKC-71 SINGLE POLE SIX-THROW COAXIAL RELAY

REMOTE SELECTION OF R.F. SOURCES!

Weatherproof, electro-magnetic, less than 1.2:1 VSWR at 100 mc, 1 kw power rating, available in UHF, N, BNC, TNC & C connectors. Continuous duty, over 1,000,000 operations. 5-⅛" x 2-¾", silver plated connectors.

DKC-71 ea. $49.50

SPECIAL CATALOG FOR MILITARY AND INDUSTRY AVAILABLE

DOW-KEY COMPANY
700 DLRS. & DIST. IN U.S. & CAN.

THIEF RIVER FALLS MINNESOTA

Here is information on the Dow-Key series of coaxial relays that is found in many publications.

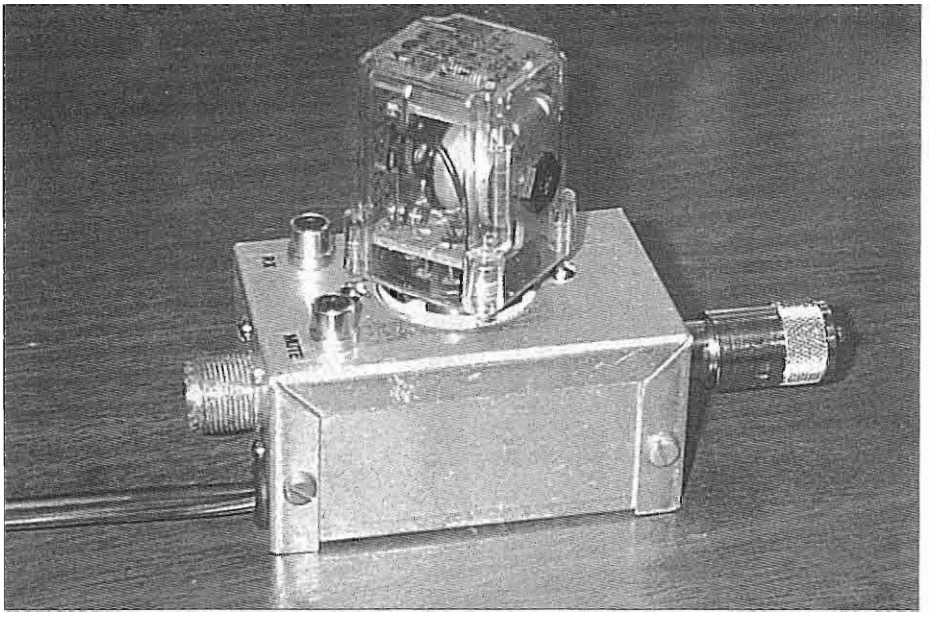


Figure 3, The author's final Potter-Brumfield relay configuration that has nearly constant impedance throughout the HF spectrum, is easy to build and doesn't cost too much.

size.

Dow-Key claims lower cross talk with increased isolation of 80db when this relay is in the energized position. In effect, what you really have is additional spacing between the center contact (the wiper) and the female connection within the SO-239 on the receive side. In other words, you have two sets of open contacts in series. One in the main relay body and one in the receive barrel.

Well now, doesn't all that sound hi-tech and everyone should be using one? Wrong! The problem is with the isolation connector and 50 years of service and exposure to the elements. I bet in many instances this problem occurred within less than 50 years. The problem to which I speak is the fact that, by design, the isolation connector cannot be made gas tight within the barrel. If it were, contamination wouldn't enter the barrel and coat the contacts; thereby causing the varying received signal levels.

The problem now is what to do with a Dow-Key Coaxial relay having a set of contacts that are concealed and not cleanable? I found another simple answer. Pull the relay and put it on the shelf for show and tell use. Now, after you do that, pick up a P & B 10 ampere DPDT relay, or similar unit, for two bucks at the hamfest and install it as your antenna-switching device. Now, you have to be a bit picky when selecting the two-dollar specials. Look at the contacts. If they have seen heavy usage as evidenced by pitted and/or blackened contacts, keep looking for cleaner ones. See figure 3.

After doing just that, I once again have P & B relays on all my HF stations. Since these units are inexpensive, I use styles having 8 pin octal bases so they can be changed in the event of a problem. So far there have been no problems for several years. The P & B antenna relay mounts well in a very small aluminum box with RF and RCA connectors and one 8 pin ceramic octal socket.

The purest Dow-Key reader types may

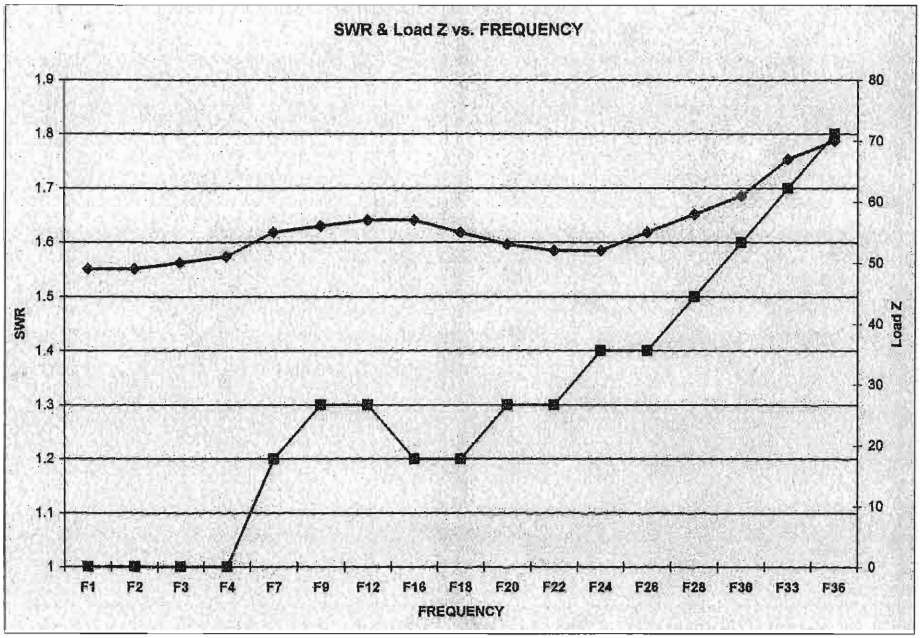


Figure 4: A performance plot of the Potter-Brumfield relay that shows SWR versus frequency in the HF spectrum.

now have some heart burn with using such an inexpensive device for antenna switching especially, with a 1500 watt PEP AM transmitter. Well, not to worry, just don't go above 10 meters because the internal lead dress and capacity to ground will greatly affect the VSWR.

Since I've been using this type of relay almost my entire ham career, I thought it prudent to once and for all perform a dynamic RF test and plot the results. The word almost relates to my novice 6L6 transmitter and S-39 receiver way back in 1954. It used an open-faced relay that was scrounged from a pinball machine! Guess a knife switch would have worked well but I wasn't old enough to know about them.

The testing was performed on two P&B KRP11AG, DPDT, 115VAC coil relays. The results for both test samples were identical. As shown in the plot, some interesting facts are displayed. The lower plot is SWR and the upper one is impedance. The SWR stays below 1.3:1 up to 22 MHz while the impedance hovers around 50 ohms from 1 to 24 MHz. From 24 to 36 MHz things start to fall apart with both the SWR and impedance rising. See the graph shown in figure 4.

So that's my story of the Dow-Key and Potter & Brumfield relays. Perhaps you are using one of these isolation connector relays and experiencing receive problems. It may be time to switch to the more economical hamfest relay and go on to bigger and better things (problems) around the shack.

ER

Just Listening

by Dennis Olmstead, WB9EMD
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It's cold and clear outside with temperature about 10 degrees. Usually you can't see the stars here near Chicago because of City light glare, but tonight they are bright and seem close enough to touch.

It's just after 2 AM and I have fired up my Viking Ranger and old RME6900 in hopes of a short QSO on 3880 KC. In the east there was a station in Annapolis MD talking with someone in Southern California. Both signals were very strong with broadcast quality audio. The discussion was about the excellent band conditions both on 80 and 160. No static crashes, no fading. Just great signals.

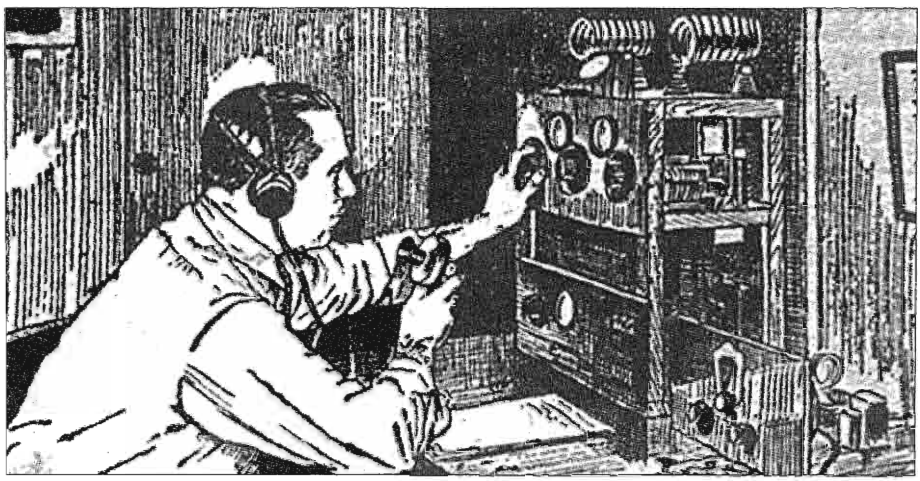
Someone near Seattle, WA came on, then a KL7 someplace in Alaska. Soon the group grew as stations near Nashville and South Carolina joined in. The group did not seem to know each other, but came together by chance.

Their discussions were about great audio, signals and homebrew rigs. One transmitter was a pair of 813 tubes modulated by a pair of 810. Another had very old Amprex finals. Someone had a modified broadcast transmitter. There were the usual DX100 and Viking Valiant rigs. The Valiant audio was modified to be flat with some sort of an audio filter in the microphone chain.

There was no interference from other stations. No agenda, no net, just radio operators getting to know each other.

Time moved along to 4 AM on the East Coast and some of the fellows there called it a night and signed. New stations arrived on frequency as the early birds joined the discussions. The band, for some reason, was still wide open. By now it was 4 AM here in mid-continent. My little Ranger was turned off without attempting to join in.

For me, this is the best of Amateur Radio. Just listening, to coast-to-coast AM signals on this rare night of perfect radio conditions. ER



Radio's Golden Age-Episode 21

by Bruce Vaughan, NR5Q
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THIS, THEN, WAS EMMA

When our first parents were driven out of Paradise, Adam is believed to have remarked to Eve, "My dear, we live in an age of transition."

W. R. Inge (1860-1954) Dean of St. Paul's, London

On a recent Saturday, late in the afternoon, I drove down Emma Avenue. Only three cars were parked between the old Post Office building and the railroad tracks. I parked in front of the First State-oops! - Worthen Bank. Looking across the street, I tried to remember where my old store was located; it looks so different now.

In the distance a northbound train sounded its whistle as it approached the Caudle Street crossing. How similar, yet so very different, was the sound of the old Frisco steam locomotives! Steam whistles produced a melodic sound unattainable by other warning devices. Sitting there alone, I watched as the late afternoon light changed from yellow to gold, then gradually surrendered to darkness. My automobile became a time machine as I recalled events from years ago, sharp and clear as if they had occurred yesterday.

April 1940...

I walked westward toward the Concord Theater, passing cars parked in front of the Pioneer. The old lumber company was one of the few business firms along Emma that did not remain open Saturday nights. After closing, Pioneer parking spaces did not remain vacant; they were soon filled by the Saturday night movie crowd.

Tradition dictated that the Concord and our new theater, the Shilo, feature Western movies Friday nights, Saturday afternoons, and Saturday nights. Normally, these were class "B" Westerns with William Boyd (Hop-along Cassidy), Ken Maynard, or Buck Jones. Tonight was different. They were showing John Ford's latest film, "Stagecoach." It starred John Wayne in his first major Western. Good reviews, no doubt, contributed to the overflow crowd.

Bob Clark (October 1993)

I forget the exact year, but it was about 1911. I remember I was about six years old when someone put a movie theater in the building on the corner of Main and Emma.

I remember going downtown one Saturday afternoon. I passed along the west side of the building, and the side door was open. The theater was unbearably hot for the Saturday matinee. Anyway, the door was open, and I stuck my head in to see what was showing. They had a movie newsreel going, showing scenes related to the sinking of the Titanic.

Some years later, Albert 'Acme' Hough, became the projectionist for the Concord Theater. This was in the twenties. 'Acme' and I were good friends; we were both interested in anything electrical. So I spent a lot of time with him in the projection room.

Well, some people from Huntsville came over to see him. They wanted to know if 'Acme' would come to Huntsville once a week to show movies-provided they could raise the money to buy a machine.

'Acme' told them he would be glad to come. All they had to do was find a suitable building and buy a projector and screen. Somehow, they came into possession of a antique 35mm movie outfit.

He talked me into going along as his assistant. I can't remember the name of the church building we used, but it was near town and on the north side of Highway.

(Note by author: This sounds like the old First Methodist Church. I lived directly across the road from it in 1932.)

We had no electricity in the church, so one of the Huntsville group provided a Fordson tractor. We jacked up the rear of the tractor and used the power take-off to drive a DC generator for the arc light in the movie machine. It was hand cranked, of course. That's why Acme needed an assistant. I only made three or four trips. Dad decided I needed to spend my nights on my college studies.

****

Albert 'Acme' Hough (1965)

When I went to work at the Concord both our old projectors were cranked by hand. I used to crank them at about the right speed for the first show. If only a few showed up for the second show, I really cranked the film through the machine. Those horses sure did run fast. I could crank a one-hour movie through the projector in 45 minutes.

Later the owner bought a pair of Powers 6-B projectors. These were the workhorses of small theaters all over the country.

When sound movies came out in 1928-29, Powers made an attachment that could be added to their 6-B's, making them full optical sound. I converted both machines. They continued to run for several more years.

****

I passed by the Concord Theater (how good the popcorn smelled!) and strolled toward Penrod's. Howard Clark waved as I walked past the window of the Clark-Deaver Hardware Company. He was demonstrating a small RCA radio to a young couple. Radio was one of their better-selling items.

Lee Gibson and an elderly gentleman came out of Oklahoma Tire. Lee was carrying a battery tester. I watched as they raised the hood of a '34 Chevrolet sedan. After testing the battery, Lee explained to the customer that the battery had a dead cell. It appeared Cecil Brown was about to sell another car battery.

As I approached the business "hub," sidewalk traffic became more congested. Some shoppers hurried by carrying paper bags filled with recent purchases. Here and there, friends and neighbors gathered in small groups, visiting and passing time, until their families were ready to go home. Odors of hamburgers cooking, hot buttered popcorn, a cacophony of sounds, dozens of brightly lighted stores, and happy crowds of people bestowed a carnival-like aura on our downtown shopping area.

Lichlyter's, The Cash, Oklahoma Tire, The Famous, Palace Barber Shop, Wilson's, Clark-Deaver Hardware, Applegate's, Joyce's, Coger's Drug stores, Myers Dime Store, Penrod's, The Minit Inn, and Martini's Arkansas Brokerage Company drew business to dozens of smaller shops and stores within this downtown area. As you traveled west past The Famous or east past the tracks, foot traffic became more sporadic.

Traffic in a never-ending stream

chugged slowly up the busy street looking for parking spaces. Finding none, cars made a "U" turn at the railroad tracks. Sometimes several trips between the railroad and the "U" turn at Shiloh and Emma proved fruitless. Eventually, most drivers gave up and settled for side street parking.

In the late forties, our city reluctantly eliminated the traditional "U" turns from Emma. Soon afterward, the city installed stoplights at Spring and at Holcomb. A shortage of parking spaces remained. There was talk of off-the-street parking lots, but little came of it.

Our city fathers, searching for an answer to downtown traffic congestion, voted to install parking meters. The decision appeared to be a good one. Unfortunately, it was an idea whose time had passed. Installation of the meters coincided with the beginning migration of business firms to outlying areas, namely Highway 71.

When retail customers began leaving the downtown area to shop on the highway, some thought it was because of the parking fee. The city council agreed, and our parking meters were removed. The return of free parking did little to increase downtown business. The shift in business from downtown areas to the suburbs was occurring all over America. In retrospect, there are things that might have slowed the migration, but nothing would have stopped it. Now, there was little need for stoplights at Holcomb and Spring; they, too, were removed.

Families often came to town early Saturday, spent the day, and returned home late that night. The entire family enjoyed looking in the stores, eating in one of the restaurants, taking in the Saturday afternoon matinee at the Concord, or just sitting in the car watching the sights.

Those who wished to avoid the sight of violence and bloodshed knew it was wise to avoid those parking spaces on the north side of Emma, between Spring Street and the Frisco tracks. Few Saturdays passed without one or more angry confrontations. Often these differences of opinion led to a fistfight among some of our "hell raisers." I would not say that all of Springdale's sin was concentrated in this one block. However, a number of earthly pleasures-both legal and illegal and not available in other sections of our fair city- were found here in abundance.

"Curb service," a custom originating in the late teens, was nearing its end. Those lucky enough to find parking in front of Joyce's, Coger's, or Applegate's Drug Store could still enjoy a fountain drink in the comfort of their cars. A short toot of the car horn would bring a young man running to take orders for five-cent cokes, fifteen and twenty-cent milk shakes and sundaes.

Rising labor costs, plus a shortage of parking spaces in front of downtown drug stores, spelled doom for this custom, relegating in-car service to a few drive-ins which catered mostly to those too young to vote.

A section of Mill Street, north of Emma Avenue—between Wilson's and the First National Bank—might well be considered the heart of downtown Springdale. Pitchmen, hucksters, curbside medicine shows, itinerant preachers—even our downtown merchants' association—found the location ideal. I enjoyed the hucksters and pitchmen most of all.

I was standing in front of Penrod's Café when the old Pontiac sedan came down Emma, turned north, and parked near the west door of Wilson's Mercantile.

A dark-complexioned man, about forty years old, stepped from the car. From under a worn cowboy hat two long braids of black hair fell forward, reaching below the pockets of his faded denim shirt. Inside the car, I could see an attractive dark-skinned young lady.

Stepping to the trunk of the car, the man rummaged through a pile of junk. He removed an old rusty cowbell, which he began ringing as he paced back and

forth across the dirt street. It had the desired effect.

A sizeable crowd quickly assembled to see what all the commotion was about. The young lady stepped from the car, receiving more than a few appreciative glances. So far, neither she nor the "Indian" had said a word.

Suddenly the ringing stopped. Walking to the open trunk of the Pontiac, the "Indian" removed a water bucket, an old number 2 washtub, and a huge sandstone rock. He placed them on the ground in front of the crowd, and then spoke for the first time.

"Where can I get some water?" he asked.

"There's a tap over by the bank," one on-looker replied. "They use it fer washin' their winders."

The man carried five or six buckets of water from the bank, pouring them in the tub. When it was half full, he put the bucket on the ground.

"I am going to show you something today you will never see again," he said. "I am going to drink this entire tub of water. After filling my stomach to the bursting point, I will beat this rock into sand, using nothing but my bare fist. I know you will never in this life have a chance to see anything like this again. Most people would give a ten- dollar bill to see a sight like this. My wife is going to pass my hat among you. I know you can't expect to see this for nothing."

The young lady passed the hat among the crowd, and then returned to her husband. He glanced down at the nickels, dimes, and quarters. Obviously, from the frown on his face, he was disappointed.

"Pass the hat again," he said. "Surely this fine bunch of people don't expect to see one of the most amazing feats in history for a few nickels and dimes. Just think of the torture my body will undergo as I drink this entire tub of water. You can see that my bladder will have to swell to a size unknown to medical science. Then with my poor distorted body suffering terrible pain, I am going to pound this rock into sand with my bare fist. Surely a few among you are willing to put some folding money in my hat."

Again the young lady passed among the gullible crowd. This time a few dropped a dollar bill into the hat. She handed the hat to her companion.

"I simply don't believe this," he said. "I am going to ask my wife to pass my hat around again. This time act like you want to see one of the most amazing miracles of the twentieth century. This is something you can tell your children and grand-children about."

The young lady passed among the crowd slowly, holding the old beat-up Stetson in front of every man there. With a demure smile, she asked in a soft voice, "Please, sir." Several bills went into the hat this round, but it was obvious the crowd was getting restless. She returned the hat to her accomplice, walked slowly around the Pontiac, and got in.

The man looked in the hat, frowned, and shook his head from side to side. Then he said, "It's plain to see that you people don't give a damn whether you see my act or not."

So saying, he plopped the hat on his head-the money still inside, jumped into his car, hit the starter, and disappeared down Mill Street in a cloud of dust, leaving his bucket and rusty tub of water in the middle of the street.

Yes, all the tricks and cons were worked here in the Depression years - three card Monte, the burned match ruse, pills that charged auto batteries, automobile ignition boosters that increased mileage, and, of course, miraculous cures for everything from cancer to "nervous spells."

It was considered entertainment; I never knew of anyone being arrested. Most of us took our loss with a smile, too ashamed or embarrassed to complain.

It was beautiful and simple as all truly great swindles are.

O. Henry (1862-1910)
American short story writer

Dick Walser Remembered

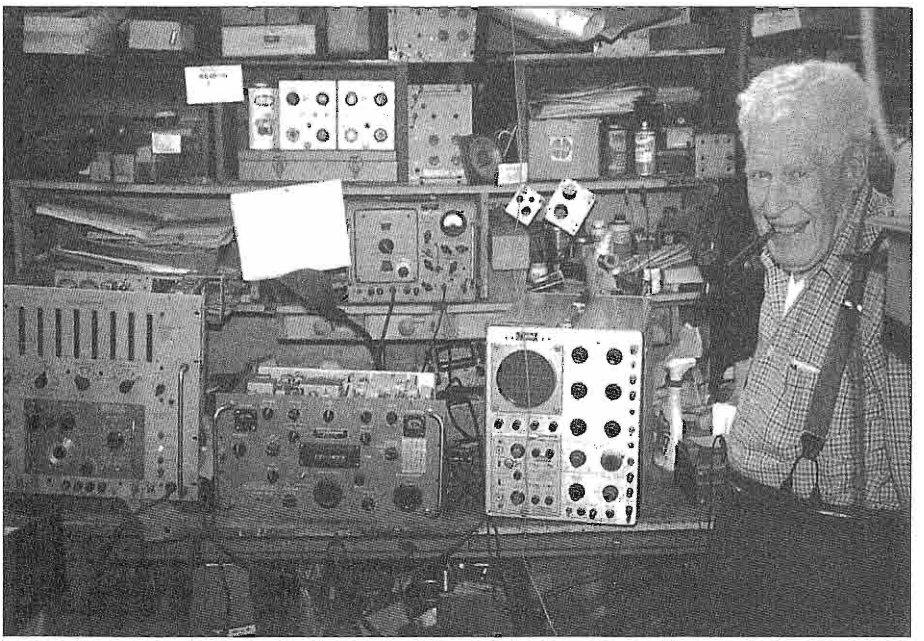
by Tom Bridgers, KE4RHH
412 Hobbs Road
Greensboro NC 27403

Dick Walser, a great friend to the R-390A community and a pioneer in the remanufacture of R-390A's, passed away on November 2, 2002. He was 85 years old.

Many readers of Electric Radio may have heard of Dick Walser from his postings in the Hollow State Newsletter. What is not as well known is his early experiences with electronics and that Dick was a co-founder of Airborne Electronics, a firm that remanufactured R-390A's in the 1970's and 1980's.

As a young adult, Dick's interest in ham radio was licensed as W6NTM. This led him to a serious study of electronics and a First Class Radio license in the early 1930's. Shortly afterward he worked as a radio operator for the San Pedro and San Diego Tuna Fleets. He had a 10-meter home brew phone rig using an 807 modulated by a pair of 2A3's on board for a few trips. He recalled having lots of fun calling CQ and signing W6NTM/Maritime Mobile, and on his Hallicrafters SX-28 hearing the frequency come alive with callers.

After the tuna boats, he worked for Bendix Radio in Burbank California constructing airborne transmitters such as TA-12's, TA-2J's, and 3801's, and also APN-1 radio altimeters. Soon World War



Dick Walser at home in North Hollywood California, April 1997. Mr. Walser was a good friend who will be missed by many.

II came along, and with the draft board a step behind Dick quickly found a post as the radio operator aboard a brand new liberty ship and made many exciting trips around the world. The shipboard rig ran a pair of 250-TH's for a cool 1 ½ KW on CW modulated by a pair of 2A3's.

A year or so later, Dick joined Consolidated Aircraft to deliver B-24 bombers and PBY Catalina flying boats for the US Army Air Corps Ferry Command. The ARC-5 transmitters and receivers and 274N series were typical low power rigs on the airplanes, and BC-375's (and later ART-13's) paired with BC-348's were used when high power was needed. When "up front" with the pilot, Dick said that you hear what the passengers never hear such as "engine #3 overheating; oil splattering on my window; manifold pressure running wild", etc. On many occasions Dick flew B-24's just off the assembly line for a 4-hour test flight ... always wondering if it would be his last!

In 1947, Dick Walser and a close friend, Glenn Sumerlin, founded Airborne Electronics, with offices and a shop at the Van Nuys Airport. For the next decade their work involved converting aircraft transmitters to crystal control on the military frequencies of 3105, 4495 and 6210 kHz, and repair and alignment of all manner of radios that today we affectionately call boatanchors. Included were receivers such as the SCR-183, SCR-274N, ARC-1, SCR-522, BC-312, BC-314, BC-342, BC-348, MN-26 (manual DF), BC-433G (ADF), ARN-6, R-388, WRR-2 (which weighs a hefty 250 lbs!) and transmitters such as, the ARC-5 series, BC-375, ART-13, and BC-610, among others. Among their clients they counted independent pilots and regional airlines, and the various surplus radio dealers in the LA area and San Fernando Valley such as JJ Candee, R.E. Goodheart, Mann Communications, Arrow Sales, C&H Sales, and Columbia Electronic Sales.

One day the owner of Goodheart brought in a 75-pound military radio (along with a manual) and asked Dick "to put it in perfect condition, and call us when it's ready." It was Airborne's first encounter with an R-390A. As they took the receiver through its paces, they were stunned by it's performance. They found accuracy to 300 cycles or better on all frequencies from .5 to 31 MHz. Sizzling sensitivity coupled with Collins mechanical filters gave real meaning to the term brick wall selectivity. They found the R-390A to be a seamless integration of mechanical and electronic engineering. It very quickly became one of their favorite receivers to repair and remanufacture.

At one time, Airborne had a multi-year contract with a well-known 3-letter government agency for a switched USB/LSB module to be retrofitted to the standard R-390A. Mounted on a small L-bracket chassis, it consisted of circuitry featuring a 6U8 tube with 2 crystals and a USB/LSB selector switch. The original BFO switch was removed and the new assembly installed in its place. A short cable fit into an 8-pin connector added near the front of the IF deck for power and signal output. The front panel was refinished, repainted and silk screened with new lettering for the USB/LSB switch.

At the peak of their production, in addition to rebuilding R-390A's, Airborne repainted and silk screened front panels, made new top and bottom covers, and refurbished knobs into like-new condition. In fact, with Dick and Glenn's metal working equipment, any R-390A metal component that failed or was missing could be quickly constructed and installed as an up-to-spec replacement. If it meant a new bracket was needed that holds the antenna trimmer assembly, they made it. If a high tolerance bushing or spacer was needed in the RF Deck, they built it too.

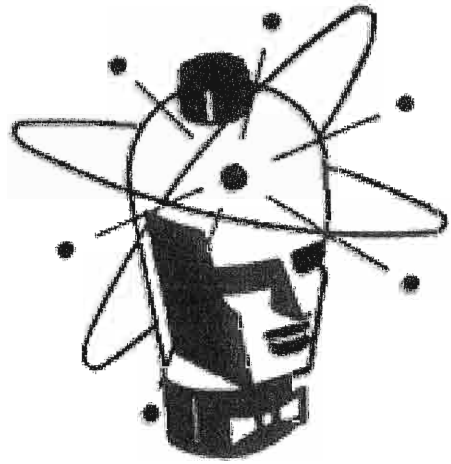
In all, Airborne remanufactured about one thousand R-390As. A large number

of them were shipped to radio dealers in the area. Not all of them went to the dealers. Todd Shipyards purchased ten radios that were to be installed in five destroyer escorts being built in the 1970's, and in the 1980's a mysterious Japanese entrepreneur purchased twenty R-390A's for his well-heeled clients in Tokyo. Most of their rebuilt radios were shipped to well-known 3-letter Government agencies. Some were shipped to countries in South America. R-390A's that were under contract to Columbia Electronics received a new nameplate that reflected "Columbia Electronics" as the manufacturer.

Dick was one of the nicest gentlemen I've ever met. His knowledge of R-390A's and R-390's (and electronics in general) was enormous, and he would readily and enthusiastically answer technical questions from anyone who called. I'll miss Dick Walser very much ... as I'm sure all of us will who ever had any contact with him. Dick leaves a legacy of a pioneering spirit, sterling character, devotion to family and his lovely wife of 60 years—DeeDee, and an unselfish willingness to helping others that are the hallmarks of a well-respected elder statesman.

[Editors note: When this editor was writing the R390a series in Electric Radio 12 years ago, I had a few valuable conversations with Dick Walser. Although he was not able to discuss some of his work for security reasons, I found him to be extremely helpful and supportive. He was like an electronic sourcebook and had the answer to every technical question that I could think of on the tip of his tongue, and did not have to hesitate an instant. He was a true gentleman and electronic genius that will be greatly missed.] ER

A complete on-line index to the entire history of Electric Radio Magazine is available for viewing or downloading at N9OO's web site: www.qsl.net/n9oo



The Hallicrafters SX-115

by Jeff Covelli, WA8SAJ
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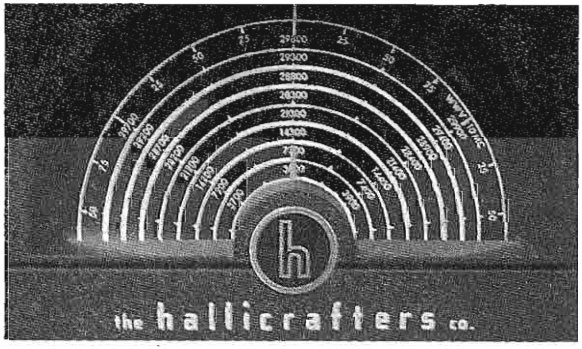
The first time I saw a Hallicrafters SX-115 receiver was when I went into one of the large ham radio stores (Pioneer-Standard) in Cleveland, Ohio as a kid of 12 years old. As I walked through those doors into the ham department, my jaw dropped and I could not believe the sight of all that new Hallicrafters gear being displayed! There it was, on a large desk



snuggled alongside a Hallicrafters HT-32B transmitter, HT-33 amplifier, and a T.O. Keyer! Wow, this had to be the deluxe station for all of ham radio. Those half-moon dials were just the things that caught my eye; they looked like real ham gear should look.

Well, as we all know now, the SX-115 was really a very good receiver even by today's standards. A.M. was king and SSB was just starting to roll along about then, and this receiver had the best of both worlds for A.M. and SSB/CW.

Hallicrafters wanted to have a receiver that could compete with a Collins 75A-4, but the SX-115 did not have any mechanical or crystal filters, as did the Collins. The price reflected that difference, about $100 cheaper, which was big money in those days. The name of the game back in 1961 was to have a very heavy receiver so it could be stable; the large tuning mechanism was in vogue, along with big heavy knobs, etc. Well, the SX-115 had an all aluminum chassis that was gold anodized, and this certainly limited the weight to 44 pounds. This was light compared to the SX-101 series at 70 pounds during the same era of time. The front panel was also aluminum, and the knobs were just right for the ham to twiddle, not too large.

The overall look of the receiver is much different from what Hallicrafters had used in the past. It has a square boxy look, with a deep chassis of 16 inches; the width is only 16 inches, and it is 10.5 inches high. This gives you a cozy feeling of having everything right in front of you. The main dial is in a half-moon shape, with calibrations of 25 kHz. A

The elusive Hallicrafter's SX-115 was a high-performance receiver produced from 1961 to 1964 and was intended to compete directly with quality receivers from other manufacturers. While not claiming any all-new design features, Hallicrafters engineers fine-tuned many long standing electrical and mechanical principles and produced an outstanding receiver with performance that stands up to the competition 40 years later.

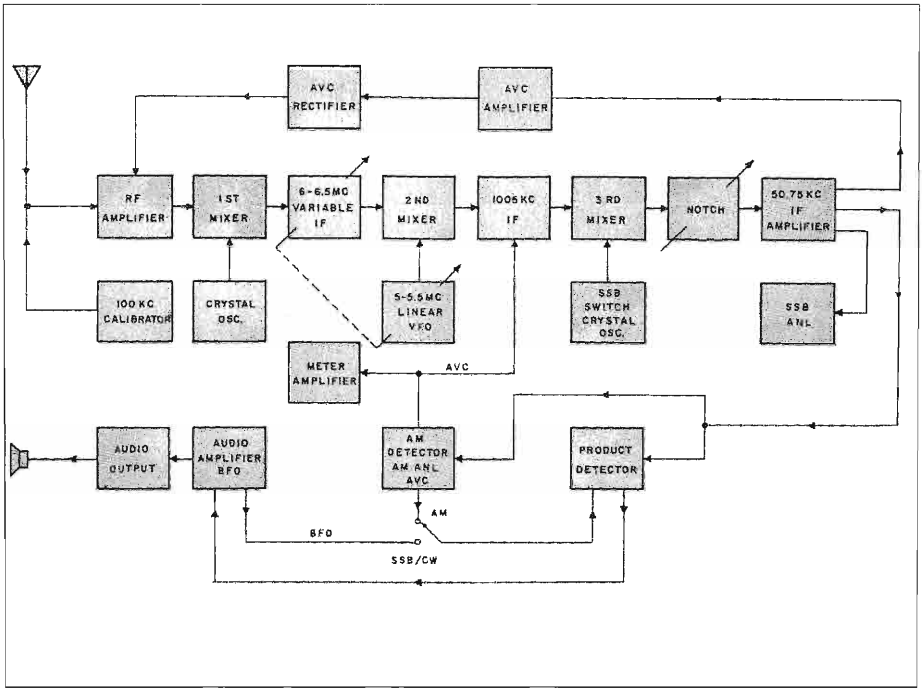
bright red dial pointer moves up and down as the band switch is turned to show what band you're on. There are plenty of #47 lamps that surround the main and sub dials, and at night with the lights turned down, it really looks good. The back of the main and sub dials are jet black, with bright white numbers and lettering which shows up very well at night. The "S" meter is also very good looking, with a black background and white lettering, along with a bright red needle to show signal strength.

The Technical Part

There are a total of 18 tubes and five diodes that make this receiver sing. It is a triple conversion ham-band only receiver, using a variable first I.F. of 6.505 to 6.005 kHz, a second I.F. of 1005 kHz, and finally the famous 50.75 kHz, with switched selectivity.

There is a high order of mechanical and electrical stability. The VFO is stabilized by the use of a large heating resistor under the VFO that stays warm whenever the radio is plugged in. The VFO (5 to 5.5 mHz) is driven by a very smooth, backlash-free split-gear mechanism with a large weighted dial drum, making for velvet smooth tuning. The calibration is better than 1 kHz on the lower sub-dial; it takes one turn of this dial to make a 25 kHz change in frequency, so there is plenty of band-spread.

There are a total of nine band selections; each one is 500 kHz wide. The



The SX-115 block diagram as published in the owner's manual. This figure clearly illustrates the dual-loop AGC systems.

receiver uses crystal-mixed control on all bands for high stability. These bands are WWV on 10 mHz, 80, 40, 20, 15, and four 10-meter sections.

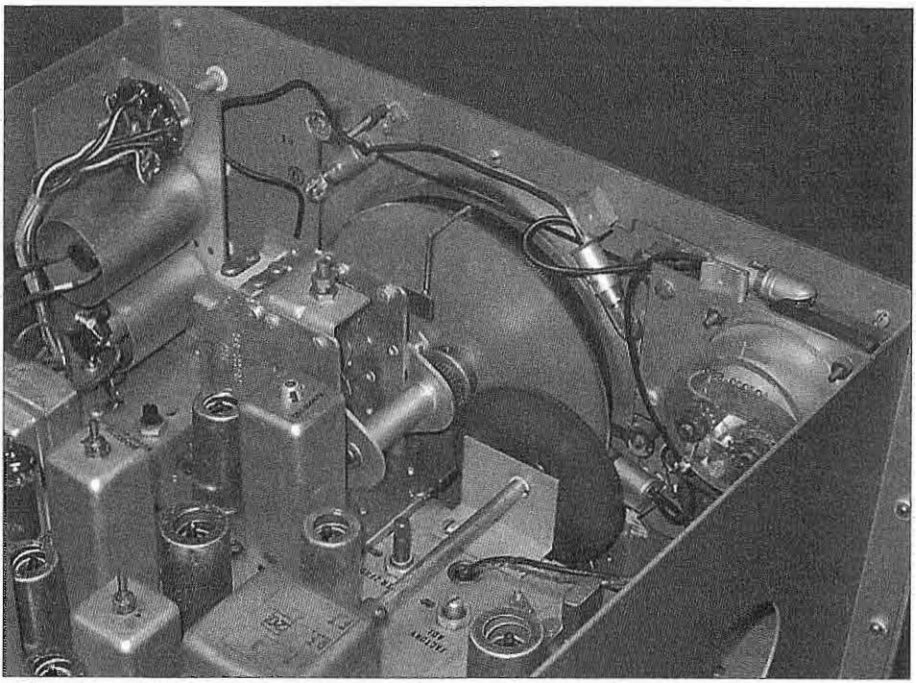
There are separate noise limiters and signal detectors. There is an IF-type noise limiter for SSB/CW and a threshold series-type for AM. Both of the noise limiters are very effective in reducing noise, and it opened my eyes to see how well the SSB noise limiter works. This is not a blanker, but it does suppress the noise enough to enjoy a QSO. A product detector is used for SSB/CW and an envelope detector for AM.

The back panel provides a speaker output of 500 and 3.2 ohms, which is rated at 1.5 watts with 10 % distortion. Also on the back is an eight pin auxiliary socket providing transmit and receive function muting, 50.75 kHz I.F. output for a scope, and a couple of open connections for whatever you might want to do. I have my Digital-Dial on these connections.

Sensitivity is rated at .5 microvolt (uv) for SSB/CW, and 1 uv for AM. The selectivity is variable in five steps providing 0.5, 1, 2, 3, and 5 kHz bandwidths at 6 DB down.

Stability is rated at better than 300 hertz after 15 minutes of warm-up, but my SX-115 drifts about 200 hertz using my digital-dial as a check for drift. The VFO has a differential temperature compensating circuit to accomplish the good stability. I was really surprised to see how stable this receiver really is.

The tube lineup is as follows: 6DC6 RF amplifier, 6BA7 first mixer, 12AT7 crystal oscillator, 6DC6 first IF amp (6 to 6.5mhz), 6BA7 second mixer, 6CB6 VFO (5 to 5.5 mHz), 6DC6 second IF amp (1005khz), 6BA6 third mixer, 12AT7 SSB oscillator, 6DC6 third IF amp (50.75khz), 6BY6 product detector, 6BJ7 AM detec-



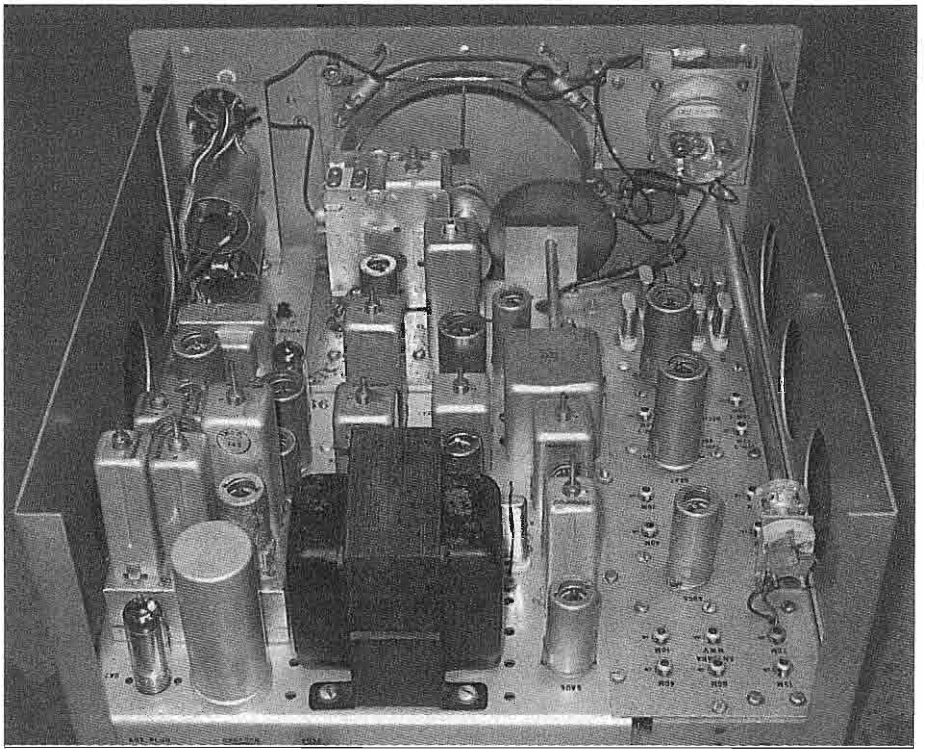
Here's a behind-the-panel view of the VFO assembly. The SX-115 uses a backlash-free mechanism to drive a linear capacity-tuned VFO. The VFO is gang-tuned with the first variable IF transformers to provide a tuneable bandpass response to reject spurious mixer response.

tor, z2nd AGC amplifier and AM noise-limiter, 12AX7 BFO and 1st audio amp, 6AQ5 audio amplifier, 6AU6 100hz calibrator, 6AU6 "S"meter amplifier, 6AU6 1st AGC amplifier, and finally an OA2 voltage regulator.

There is another feature in this receiver that sets it apart from other rigs of the period. The front end has a sharp "band-pass" type of circuit, along with a fine-tuning control. There is a very high-Q "T"-notch circuit in the 50 kHz IF section of the SX-115 that works very well. About 50 db is expected, and it works on both AM and SSB/CW modes.

The 50.75 kHz last IF was very common among the Hallicrafters receivers in the 50's and 60's. It used four high-Q shielded IF cans to avoid any signal transfer by inductive coupling. The selectivity switch changes the "Q" and the coupling of the tuned circuit by selecting various values of capacitance and resistance. Depending on the model of Hallicrafters, some only had a three-position switch versus a five-position switch as on the SX-115. For the most part, this arrangement worked well for Hallicrafters in the years after the SX-115. The SX-117 also used this IF scheme, and it had a three-position selectivity switch until about 1965. I use the 5 khz position most of the time on AM, but even the 3 khz position sounds good for communications quality. On SSB the 2 or 3 kHz is used and it works well, even on the crowded 75 and 40 meter bands.

While I'm on the subject of the 50.75 kHz IF, I'd like to point out that Hallicrafters used the "T-Notch" system in the 50.75 kHz IF on a few of the better receivers. This worked very well in notch-

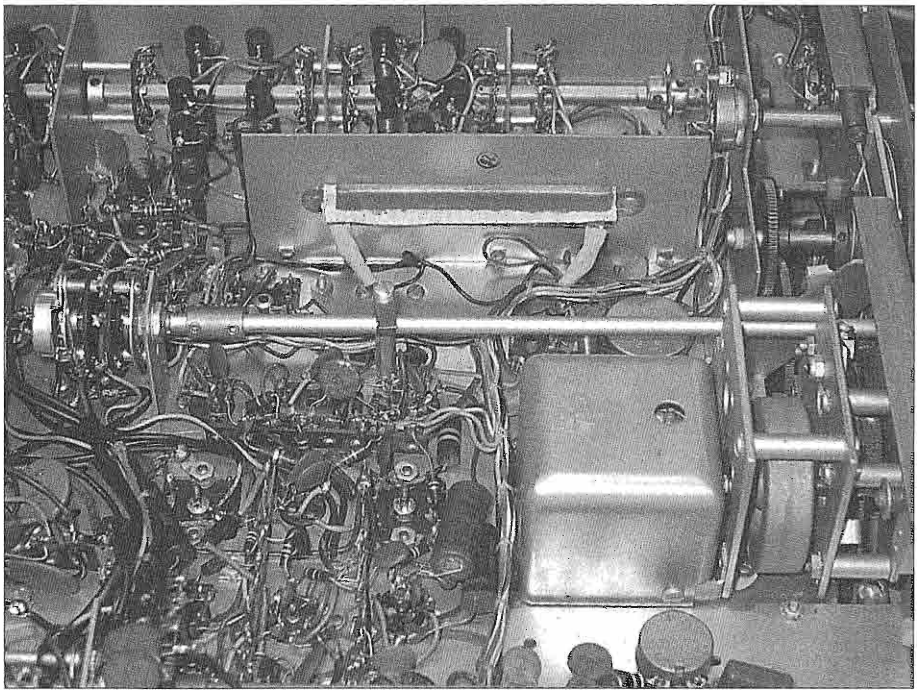


Looking from the rear of the SX-115 chassis shows the 50.75 kc IF transformers mounted on a seperate chassis at the left rear. The first variable IF transformers are just ahead fo the power transformer. The antenna coils are at the right front of the photo, and the 6DC6 RF amplifier is just ahead. This chassis came from the factory gold anodized.

ing out anything within the 50.75 kHz pass-band by a good 50 db! The control is on the front and has calibrations by the IF frequency on the front panel knob.

The beat frequency oscillator (BFO) has a control to set the pass-band of the last 50 kHz IF. This is a nice feature and can be used on both upper and lower sideband. If there is someone close to you, the BFO control works well to eliminate the QRM.

One of the unique features of the SX-115 is that it has a dual amplified automatic gain control (AGC) system, with fast attack and slow release time for smooth sounding recovered audio in all modes. It sounds very good. Most receivers of this time only had a single AGC system. The dual AGC systems work in tandem. The 6AU6 first AGC tube, V-12, comes off of the 6DC6 3rd IF amplifier tube V-11. V-12 amplifies and applies AGC only to the 6DC6 RF amplifier, V-2. This usually will give about 20 DB or so of dynamic range. After that, the second AGC loop takes over, with V-14 (6BJ7) coming off of the detector stage and applying AGC to V-8, the 6DC6 1005 kHz IF amplifier. The 6AU6 S-meter amplifier tube V-13 is also driven from the second AGC loop. By having two AGC circuits, Hallicrafters thought this would give more control over strong signals and it works very well indeed! There



This figure shows the VFO heater, which is a power resistor that is mounted to the large aluminum plate in the top center of the photograph. The metal plate distributes the heat developed in the resistor to the VFO components. At the lower right is the VFO compartment and the large flywheel that is spun by the front panel dial.

is no sign of overload in AM or SSB/CW at all. There is very good control of gain throughout the entire receiver.

Conclusions

After 37 years of being a ham, I finally got the receiver I always wanted after seeing it displayed so well at the ham store. I wore out pages in my Allied, WRL, and Lafayette Catalogs thumbing through them wondering if my paper route money could afford such a deluxe receiver. I can really say this is a very nice receiver, and I have one tied to the Johnson Ranger for AM operation and occasional SSB listening. During my work time at a very large ham store here in Cleveland I never had the chance to see one come in on a trade either, so there must have not been very many of these around. As time went on, I did manage to acquire a National NC-303, and that is a nice receiver. Of course I sold it as a kid. Hope to work some of you folks down the page OM, with my SX-115.

ER

Mystery Test Set

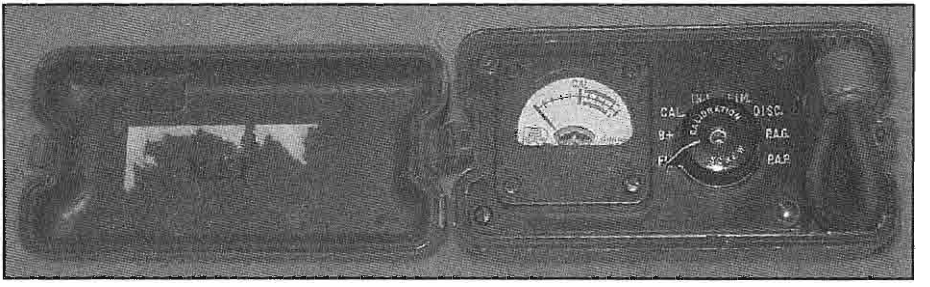
by John Hruza, KBØOKU
2521S. Holly St
Denver CO 80222
jhruza@earthlink.net

I recently picked up this unit at a local hamfest. It appears to be a test set for a vacuum tube military FM transceiver. Its cable ends in a plug that matches a 7-pin miniature tube socket. It has an Ideal model 131 500ua dc meter and a Raytheon JAN-5678 peanut tube with a 6/65-date code. A Centralab 4p-8t rotary switch with a concentric "Calibration Screw" operates it. The switch selects FIL, B+, CAL, INJ, LIM, DISC, PA G, PA P. The data plate is missing!

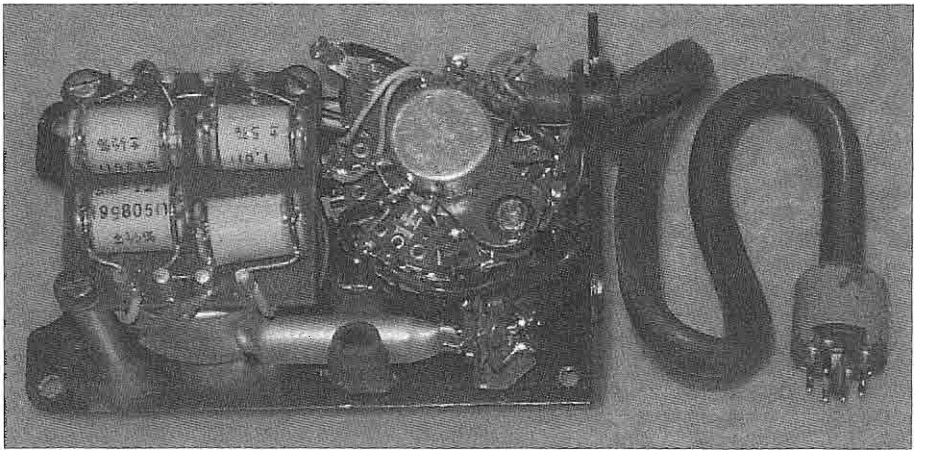
Can anyone help me identify this thing? And/or tell me what equipment it was used with, and maybe even how it was used?

Also, I would be happy to pay for a manual copy if anyone could provide one.

ER



Above, the mystery set is pictured with the front cover open and below it is shown with the set removed from its case.



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FOR SALE: Collins 75A-4 S/N 189, VG to EXC condx. Very clean inside and out. No mods, 4:1, one 3.1 kc filter, $850.00. 500 hz filter $150.00. 75S-1 non-working, dial slips, otherwise VG condx. $300.00. UPS extra. Bob Zimmer, NV1X, 205 Brigham Hill Rd., Milton VT 05468, 802-879-7235, bobzimmer@MSN.com

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FOR SALE: Hallicrafter S-76 with matching speaker/manual. Hallicrafter S-85. Heath G 81 regen/rcvr with original manual. Bob Speckhals WBØDMC 507 331 5103.

FOR SALE: Hallicrafters SX-71, parts set; Knight R-55A Receiver, $75; Realistic DX-120 Receiver, $55. Mike Grimes, K5MLG; 3805 Appomattox Cir; Plano, Texas, 75023, (972) 867-6373. Email: grimesm@flash.net

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FOR SALE: Receivers: Hallicrafters SX-111 xlnt condx, works, $165.00. Heath GR-64 $30.00. Realistic DX-100 works. Ron, MI, 517-374-1104

FORSALE: Heath HA-14 Linear w/AC supply, excellent, $425; Clegg Thor 6 w/AC supply, vgc, $225. Richard Prester, 131 Ridge Road, West Milford, NJ 07480. 973/728-2454. rprester@warwick.net. . 973/728-2454. rprester@warwick.net

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FOR SALE: Communications Receivers, Military Communications and some test equipment. SASE, Don Jeffery, 131 North Ivy Ave., Monrovia CA, 91016, boallan@aol.com

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FOR SALE/TRADE: Manuals: S53A, DX100, 75A4, DX4O, 75A1, Ranger, TR5, 30L1, HA350, NC183D. A.J. Bernard, POB 690098, Orlando, FL 32869. 407-351-5536

FOR SALE: Pwr sply BC-610-I, BC-375E, PU only, Prescott, AZ. W7RBF, AZ 928-778-1993

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: TX'ers, rcvrs, parts, manuals, etc. Send a large SASE. EFJ Thunderbolt excellent $900.00 YaesuFT-22m FM $50.00 Regency HR2A $35.00 Regency 12V PS $15.00 More at http://come.to/AF4K/ Brian Carling, 117 Sterling Pine Street, Sanford, FL 32773 Brian Carling, AF4K, 117 Sterling Pine St., Sanford, FL 32773.

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

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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

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FOR SALE: Books, send SASE. **WANTED:** Anything by Fairchild or Langevin. send SASE for my want list. Richard Robinson POB 1425 Wallingford CT 06492, 203-949-0871 or richmix@erols.com

FOR SALE: Manuals for old ham gear of the '30s to the '70s. Check WEB Catalog www.himanuals.com

FOR SALE/TRADE: Misc. parts, tubes, for tube gear. Sandy Blaize W5TVW, 40460 Edgar Traylor Rd., Hammond LA 70403. ebjr@i-55.com

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

NOTICE: T-368 Registry. For info w2zr@aol.com Subscribe to the T-368 & BC-610 reflector at http://groups.yahoo.com/group/T-368_BC-610

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. 516-653-535

FOR SALE: We have ham gear, tubes, parts and so much more! Carl A. Blomstran, POB 890473, Houston, Tx 77289. Please visit www.nadioworldonline.com.

FOR SALE: Aluminum knob inlays, Collins, Drake, National, Hallicrafters, Heath; Collins Dial Drum Overlays. Charlie Talbott, 13192 Pinnacle Ln, Leesburg VA 20176 540-822-5643, k3ich@arrl.net

FOR SALE: Some unused obsolete Triplett tester transformers. Free List. Bigelow Electronics, POB 125, Bluffton, OH 45817-0125

FOR SALE: VM parts, new-boxed electron tubes, new Heathkit parts, and new panel meters. Norm, 1440 Milton St., Benton Harbor, MI 49022

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: New and used early radio and collector tubes. See www.fathauer.com for lists or email tubes@qwest.net. George H. Fathauer & Assoc., 688 W. First St. Ste 4, Tempe, AZ 85281, 480-968-7686. Toll Free 877-307-1414

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: Collins S-line and A-line repair. FCC licensed, many years of experience. lal@metrocast.net 207-457-9257

FOR SALE: Convert any wattmeter to read PEP! Perfect for AM/SSB-$19.95 ppd for complete kit! HI_RES, 8232 Woodview, Clarkston MI 48348, 248-391-6666, hires@rust.net

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

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 feltoned@coffey.com www.feltondesign.com

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

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: WACO-5NWX telephone filters. Just plug in. 1 /$13.95, 2/$25, 3/$34. Money back. Cecil Palmer, 4500 Timbercrest Ln., Waco, TX 76705. 254-799-5931 w5nwx@hotmail.com

FOR SALE: 51J-4 filter replacements, direct plug in—6.0 kc Collins mech. filter, 3.3 xtal lattice, 2.3 kc xtal lattice, 500 cycle xtal lattice -$245 each; R390A 16kHz flat phase filter, for Hi-If AM-$245. Inquire about free AM xmtr parts, PU only, or S&H charge otherwise. Chuck Felton, KDØZS, WY, 307-322-5858, feltoned@coffey.com, www.feltondesign.com

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

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

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

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FOR SALE: 2 ¼" dia XP53 plug-in coils; 3 ea. 5 pin, 1 ea. 4 pin, All 4 $6.00 + shipping. Henry Mohr, W3NCX, 1005 Wyoming, Allentown, PA 18103-3131

FOR SALE: Aluminum heat dissipating plate and grid connectors for all 3,4 and T series Eimac including 3-500Z, 4-1000, 304T's and 1000T's, W1ETC, Box 747, Amherst, NH 03031 etc. Alan Price fixr7526@cs.com

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FOR SALE: QST full years '51, '53, '56 $12.00. '43, '46 $16.00 each. Shipped USA. Tom Berry, W5LTR, 1617 West Highland, Chicago IL, 60660, 773-262-5360

FOR SALE: Many parts for radio builders please call to discuss needs. Joe Battyany, W6CAS, 1501 Sherwood Ave., Sacremento CA 916-731-8261

FOR SALE: Sam's Photofact numbers 1-1300. $5.00/radio ppd in USA. Don Kuhn, W8KPD, POB 686, Marion OH, 43301-0686. 740-383-5744

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

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: I very much need your help in finding these parts for my Collins 30K: Output Coil and Switch assembly, even partial parts, Modulation transformer, Pair 75th tubes, will consider 100th, Plate blocking Cap 150mf. If you have or know the whereabouts of these parts Please help. Thanks. BOB (916) 967-7552) Ca. rbrtkj6ca@aol.com

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WANTED: Schematics only for Heathkit SS-9000. Have all other info. Marvin, 770-429-0314, mmoss@mindspring.com

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WANTED: Burstein Applebee FU-40 tx'er/exciter. Any condx with or w/o tuning units. Ted Bracco WØNZW, 217-857-6404 X306. braccot@hotmail.com

WANTED: MacKay 3010 rcvr. Cliff WA9SWE 608-625-4527 after 6 PM Central.

WANTED: BC-348 rcvr and TCS tx'er. Jerry, N5KYE, 405-373-4727

WANTED: In excellent operating condx, Gonset G-28 10 Meter Communicator. Roland V. Matson, W1CSO, POB 956, Lake Panasoffkee, FL 33538, 1-352-568-1629

WANTED: Johnson 150D70 or National TMA150 Capacitor. Alan Dale, W9ZPP (812)424-5208 9zpp@evansville.net

WANTED: Collins 70K-2 PTO preferably in working condx. W3QII, 5899 Barnes Ave, Bethel Park PA. 15102, 412-835-7015

WANTED: Military MT-297/GR mobile mount, C-435/GRC control w/meter, C-375/VRC control box w/cable. John 440-243-8119 K8GVH1@juno.com

WANTED: June 1945 CQ. **FOR SALE:** Nov & July 1945 CQ, $7.00 ea. Tom Berry, W5LTR, 1617 W. Highland, Chicago IL, 773-262-5360 or 773-262-0016

WANTED: James Millen plug-in coils p/n 42080, 42040, 42015, 43015. Commercial prewar transmitter. Gary Carter, WA4IAM, 1405 Sherwood Drive, Reidsville, NC 27320. Phone: 336-349-1991. Email: gcarter01@triad.rr.com.

WANTED: FADA 33, Hallicrafters spkr for SX-23, Mil TCS rcvr in gd condx. Bob Forte, PO Box 160, Lake Luzerne, NY 12846, 518-696-2400, email: forte@capital.net

WANTED: BC-375 or BC-191. 229-273-7264 W4ZXW, W. J. Hill, 510 E. 25th Ave, Cordele GA, 31015

WANTED: Hallicrafter S40/A/B in at least repairable condx. Appearance not too important. Carl, W2IQK, 51 Mt. Orange Rd, Slate Hill NY 10973, 845-355-1596

WANTED: Hallicrafters HA 20 VFO Line Sampler, or a schematic and parts to homebrew. H.I. Stark, K9UBL, 3215 S. Meridan Street, Indianapolis IN 46217-3231

WANTED: APS-90 Pwr Sply for Harvey Wells T90 Txer. Ed, WA7DAX, 1649 E. Stratford Ave, Salt Lake City UT 84106, 801-484-5853

WANTED: Front panel milliammeter for the Harvey-Wells T-90 Tx'er. Richard N. Pann, W1SUJ, 2447 Yates Drive, Augusta GA, 30906, 706-798-7279. rpann2@comcast.net

WANTED: Relays from Johnson Matchbox KW and 275 watt. Raymond Fisher, WA8JLT, 937-692-8550 call collect.

WANTED: 5AP4, 5BP4 or 1805-P4 CRT for my 1939 Andrea TV set. Arch Doty, W7ACD, 503-554-9142 archd@aol.com

WANTED: Information on Military use of TCS rcvr/tx'er and BC-611 walkie-talkie. Louis L. D'Antuono, 8802 Ridge Blvd, Brooklyn NY 11209. 718-748-9612, 6PM.

WANTED: Lafayette HB-400 or HB-333 or Olson Tube Type CB set for conversion to 10M AM. Will pay your price working or not. Bill Smitherman, KD4AF, 9401 Hwy 67, East Bend NC, 27018. 336-699-8699

WANTED: Power supply and connecting cable for a Harvey Wells T-90 Bandmaster Tx. Ed, WA7DAX, 1649 East Stratford Ave., Salt Lake City UT, 801-484-5853

WANTED: CINCH-JONES plug P310-CCT. This is a 10-contact plug with 5/32 inch wide contact blades, and with cable clamp in cap. Vernon Yeich, 1700 White Hall Rd., White Hall MD, 21161, phone 410-357-5112

WANTED: Looking for 2 anode connectors for 4CX250 tubes, and a main tuning knob for the KWS-1. John Munro, G3GBB, tel. 01379-783657. jmunro2@ukonline.co.uk

WANTED:: The two red jewel lights on the front of Johnson Ranger. RbrtKJ6CA@aol.com

WANTED: BC-610 transmitter within driving distance of the Twin Cities MN, Email me with information at w0ir@attbi.com

WANTED: Manual or schematic for National VP4050A counter and Realistic Signal Generator A11IM. Will pay for copies. Roger K1TG rwkuchera@snet.net

WANTED: HELP: I need information on a E.M. Sargent Co. Model 205A 5-band radio circa late 30's (?). David Miller, 307 754-4351 or K7ALR@arrl.net.

WANTED: Pwr Xfmr for Browning Golden Eagle MK IV. 110V pri/sec 32.4, 280, 9, 6.3 VAC. Bob K8MGC, 330-879-5250 BobJudy@sssnet.com

WANTED: Cabinet only for Heath AT-1. Rough OK. Dick Bixler 503-690-2557

WANTED HELP: Your grand-son build a successful and simple vacuum tube regenerative receiver. Reprints of Gernsback 1930's plans for sale. Free List. Bob Ryan, 1000 S. Gilbert St., Apt 132, Hemet CA 92543-7065

WANTED: T-368, GC, will PU locally, also 75A-4 filter clamp. KC9VF@arrl.net

WANTED: SBT-1K TMC PS-4 pwr sply need manual or schematic. Bernard Drew, Bernard@quidnunc.net

WANTED: (Badly) Harvey Radio Labs Model FT-30, 1935 Xmtr. See E. Rippon guide p.57 or FOS p.257. This was my rig back in 1941 when my call was W1NLL. In needed, I will send you a picture copy. I will pay $1000.00 plus shipping for one in almost any condition. Robert Enemark, W1EC, PO Box 1607, Duxbury MA, 02331. 781-585-6233

WANTED: Wanted: Manuals for Collins Antenna Tuners 180-Y and 180-V Mike Kincaid - W7FKF, 248 Justin Road, Murphy, TX 75094, 972-578-1120

WANTED: TCS Army-Navy rcvr 1.5 to 20 Mc, and good manual to rework Globe King 275. WØBEI, 800-500-8055. Dave.

WANTED: Collins 51J-4 complete, reasonable price paid for a nice clean one. Art Plummer, 650-359-1858, w6lr@arrl.net

WANTED: GRC-9 microphone, Headset, speaker. Lee, N2UDF 315-656-9578,or Lcarroll@post.com.

WANTED: Coil sets for HRO-50. Casey, W8FDE MI 231-755-1579 FAX 231-737-3101

WANTED: Panel meter M-100 for Johnson Desk KW. 50-500 MA DC grid-modulator current. Face marked two scales. Bottom 0-50, Top 100, 200, 300, 400. Also bottom of face #796, FS=5MA, 20 ohms 100 mv. Or does anyone know how to modify the circuits for maybe two separate meters? Bob, WA6ICL, 14463 Astoria St., Sylmar CA, 818-362-7404

WANTED: SB-104 main tuning knob. Ed Cuevas, Ft. Worth, 817-222-5355, ecuevas@juno.com

WANTED: Cakepanion 2 tube regen rcvr. Prefer w/ all coils. Doug Reeves, WB6RKY, PO Box 278135, Sacramento CA 95827. wb6rky@hotmail.com

WANTED: Coil "C" for HRO-60. Gerald Park W8QS, 517-351-5106, park@msu.edu

WANTED: Galaxy (WRL or HyGain) LA-550 Linear, RF-550 Wattmeter, CAL-250 calibrator. All answered! Kelley, W8GFG, 9010 Marquette St., St. John IN, 46373; 219-365-4730

WANTED: Tech help to modify xtal controlled transistor CB rig for ham bands. Rex, PO Box 4518, Jeffersonville IN, 47131, 812-282-4824

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 brent@emeraldis.com

WANTED: AN/WRR3-R1134 VLF receiver. Jack Holzer 913-791 5141, days

WANTED: KNOBS and front panel meters for the GRC-19 set, T-195 and R-392. Please contact Gary W5UUO, 450 Cunningham Road, Celina, TN 38551 931-243-5323 w5uuo@info-ed.com

WANTED: Westinghouse MW-2 and MW-3 transmitters and parts. Also HP Model 1727A Oscilloscope manual. Gary, WA4ODY, Seabrook TX 77586, 281-244-7695, myctpab@earthlink.net

WANTED: Manual for General Radio Co. Unit Oscillator Type 1211-C (.5-50 Mc.) Jim Eberwine, W4APV, 8118-37th Ave. North, St. Petersburg FL. 727-347-0942

WANTED: Empire PA210 Panadaptor, URM-25 Sig Gen, URM-26 Sig Gen, URM-7 Rec SBT. Dean, 6725 Portland Ave South, Richfield, MN 55423

WANTED: Schematic diagram for Freq Meter CRR 74028 (part of LM-13). Frank Hill WA6SYI 1313 Milton Ave., Walnut Creek CA, 94596 fdhill@attglobal.net

WANTED: Hallicrafters HA-20 VFO Line Sampler, or schematic and parts to homebrew. H.I. Stark, K9UBL, 3215 S. Meridian Street, Indianapolis IN 45217-3231

WANTED: BC-639 VHF RX and RA-42 power supply. Northern CA pickup preferred. Ian Abbott, KC6UPT, ian@wildblueaviation.com (209)747-3639

WANTED: TBX radio and/or accessories required by military radio collector. Ray, VK2ILV, ROBINSON@SHLRC.MQ.EDU.AU

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

WANTED: Fully functional w/manuals: Johnson AN/FRT505 xmtr, Swan F51 and FC76. Contact Ric at C6ANI@ARRL.NET

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: Still looking for manual, schematics, trouble-shooting, RCAF Rx by TMC R-5007A/FRR5O2. David Boardman, VA2DVD, 418-877-1316 radioman@dbtubes.com

WANTED: BC-348 () rcvr w/following suffix: B,C, H, J, K, M, N, P, S, for collection. Ken Kolthoff, K8AXH, POB 215, Craig, MO 64437. 660-683-5353

WANTED: B&W plug-in coils 80MEL, 800ES, 80BVL, 80JVL, 80TVL. Jim Jorgensen, K9RJ, 1709 Oxnard Dr., Downers Grove, IL 60516. 630-852-4704 k9rj@attbi.com

WANTED: Hallicrafters SX 88 parts chassis with cabinet, power, audio output, 50 khz IF and 2 mhz IF transformers. Ops service manual for Eddystone EC958.. Allan, Norco CA, (310) 812-0188, alan.royce@trw.com

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

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 George H. Fathauer & Assoc., 688W. First St. Ste 4, Tempe, AZ 85281. 480-968-7686, Toll free 877-307-1414

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: Collecting military electronics including radio, radar, RDF and test, manuals & literature. William Van Lennep, POB 211, Pepperell, MA 01463. 978-433-6031

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

WANTED: Stancor/Chicago PCC200, PCO/PSO15O, RC8150; Triad A-9-J, A-l0-J, A-1l-J, A-12-j. **FOR SALE:** Books, send SASE, Richard Robinson, POB 1425, Wallingford, CT 06492. 203-949-0871 richmix@erols.com

WANTED: R-390A rcvrs, parts rigs or restorable, will restore yours at reasonable prices. Walter Wilson, KK4DF, 706-733-8323 wewilson@knology.net, www.knology.net/~wewilson

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

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, $74.95) 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.

All videos are now available in PAL versions!
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 582, PINE COLORADO, 80470-0582
Now avilable on-line at the ER website: WWW.ERMAG.com

WANTED: QSL cards from old/pre WW II Ham DX countries; old regen kits. Hajime Suzuki, Nishikuniyoshi 1644-24, Ichihara-Shi, Chiba-Ken, 290-0231 Japan

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

WANTED: Collins 310B3, basket case OK - welcomed; & Chicago 500W CMS-2, high-level modulation xfmr; Taylor T21. Jerry, W8EGD, CO, 303-979-2323

WANTED: Kleinschmidt teleprinter models: 311, 321, (AN/FGC-40, AN/GGC-16, AN/UGC-39...) Tom Kleinschmidt, 506 N. Maple St., Prospect Hts., IL 60070-1321. 847-255-8128

WANTED: Visitors and tubes by museum. Old and odd amateur or commercial tubes, foreign and domestic purchased, traded or donations welcome. All correspondence answered. K6DIA, Ye Olde Transmitting Tube Museum, POB 97, Crescent City, CA 95531. 707-464-6470

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: RBB/RBC rcvrs, pwr splys, cables & RAK/RAL equip. Andy Miller, KD6TKX, CA, 831-484-2389, amillertkx@aol.com

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

WANTED: RCA 140,141, AVR5A. GE K80, K8OX, K85. Any condx. James Treherne, 11909 Chapel Rd., Clifton, VA 20124. treheme@erols.com

WANTED: ARC-2, ARR-7 and ARR-15 racks; BC1387 for BC-611; whip antenna for PRC-124. Joseph Pinner, KC5IJD, 818 Hill St., Kingston, TN 37763. kc5ijd@bellsouth.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: Parts for a TMC GPT-750 xmtr. I need the AM modulator deck and other parts to restore this unit. John, KF2JQ 716-873-0524 jprusso@acsu.buffalo.edu

WANTED: Collins 30K1 xmtr; also need orig manuals & literature for 75A1, 32V1, 30K1. Paul Kluwe, W8ZO, POB 84, Manchester, MI 48158. 734-428-2000

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, james.true@ibm.net

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: DC ammeters, aircraft instruments, panel meters; meter books & gauge catalogs; photos of meters & control panels. Chris Cross, POB 94, McConnell, IL 61050.

WANTED: Service manuals, originals, and copies for copy of HP 3330B, HP 3582A, and HP 11710A. Will pay ALL exp. and more! Reinhard Wieschhoff, 7 rue du Debuche, F-78120 Rambouillet, France. Tel/Fax: 00331304111 02

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

WANTED: Russian 1.5-8 MHz military transceiver, type P(R)-131. Will pay well for a good one. Leroy Sparks, W6SYC, 924 W. Mc Fadden Ave., Santa Ana, CA 92707. 714-540-8123 leroysparks@earthlink.net

WANTED: SW3 #33A and #35 coils. I will trade my extra coils SW3 coils. Hank Bredehorst, 2440 Adrian St., Newbury Park, CA 91320. 805-498-8907

WANTED: Long wire antennas AT1O1, AT1O2, GRC-9; Bendix ATD tuning unit Type CRR 47211, 9050 to 15800 kcs; Gas engine generator UPG-12 (GRC-109) KA1ZQR, 348 N. Main St., Stonington, CT 06378.

WANTED: Gonset G-76, Valiant II, Yaesu FTdx400, Hammarlund HX50A, Phillips 777 Automotive Short Wave Radio. KBØW, 916-635-994, frankdellechaie@sprintmail.com.

WANTED: National SW-3 model, version 3. Uses 32-32 30 tubes. Dean Showalter, W5PJR, 72 Buckboard Rd., Tijeras, NM 87059. 505-286-1370

WANTED: Collins 32V& Collins 75A series; Globe Scout; National SW54. KBØW, CA, 916-635-4994. frankdellechaie@sprintmail.com

WANTED: Hallicrafters SX88 or SX115. Larry Redmond, 413 Bedfort Dr., Duluth, GA 30096. 770-495-7196

WANTED: Parts to complete AN/ARC-59 RDF system for ER avionics article: Need MT-1913/ARN mount base for the DY-150 dynamotor, MT-1212/ARN for the R-836 rcvr; cable assy ARC-17984 or ARC-18637. Please call or email Ray, NØDMS at ER: 720-924-0171, ER@OfficeOnWeb.net Thanks to all who have responded!

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