SoundWaves

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VRPS Summer 2017

From the President

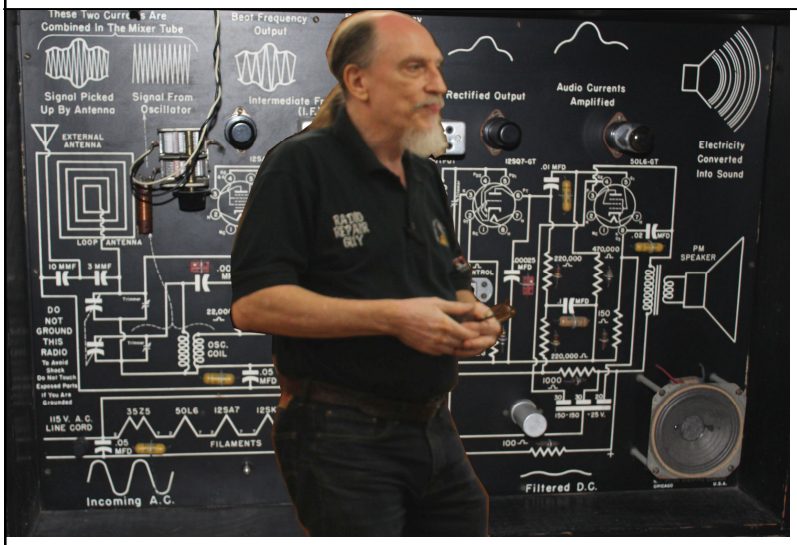
By golly, it did not take long to get hot here in Texas. I think it was Will Rogers who coined the phrase "Everybody talks about the weather, but no one does anything about it". Well I think Will was on to something, so we will not continue to talk about it. But radios--that is something we can talk about. Our monthly meetings have been well attended and full of enthusiasm. A large credit for that goes to Larry Lindsey and his planning for meeting topics that are of interest to the membership. If you are in the metroplex or can make the drive to Irving once a month for a meeting, you will likely not be disappointed.

Now, while I am really fond of our organization and our monthly meetings, each summer when the temps start rising (there I go, talking about that weather thingie again), I want to mention other club activities within a day or so drive. Houston is the closest, and they have a lot going on, so check out their website, www.HVRA.org to see if you will be in town when they are meeting. Michigan, New York, and Pennsylvania also have a major event during the summer months. I tend to like the Antique Radio Club of Illinois' Radiofest annually the first weekend of August. They have a really nice outdoor flea market, numerous technical and interesting seminars, top-drawer contest and display area, and their auction is pretty good as well (I know their auctioneer personally). As is my custom, I would encourage you to attend at least one of these (there are probably others) to enhance your collection and knowledge of the hobby.

Switching topics, I hope you are as excited about the change in venue for our annual convention as I am. While the Hampton Inn in Mesquite served us well for 17 years, management changes and continued price hikes over the last 5 years proved too much for us. After much searching, we agreed to sign a contract with the Comfort Inn and Suites in Plano for one year, with an option for three years. We negotiated really good room rates so our members could all be at one location. Many folks have already called to reserved rooms for the 3rd weekend in November. If you have not yet done so, please go ahead and do so now. The convention packet will be in the September SoundWaves...watch for it.

Until next time, good hunting, and I will see you at a radio meet this summer.

—Jim



Notes from the April 15, 2017 Meeting

Our meeting was conducted by club president Jim Sargent, who reminded us of upcoming events. Then our program director Larry Lindsey presented the October SMITR award to Jim Sargent for knowing that Thomas Edison invented a piano made of concrete. Larry then introduced Mike McCarty, who presented his "Introduction to Superheterodyne Theory".

Mike presented basic receiver theory. For receiving, the required steps are:

- Intercepting the signal.
- Selecting the desired signal.
- Demodulating (detecting) the signal.
- Reproducing the signal (converting it to sound)

Mike showed a tutorial video illustrating the basic principles of Radio, including how electron flow is controlled. The video described the principles of operation of inductors, capacitors, transformers, tubes and other parts involved in tuning, processing and transmitting radio signals.

Mike discussed condensers (now called capacitors) and how they are used to tune-in, or *select*, a given signal. He also talked about *bandwidth* or the range of signal frequencies passed to the next stage of the radio. It is the nature of tuned circuits that the bandwidth is a percentage of the tuned frequency, and it must be at least adequate to handle the sidebands created by the program material that modulates the station carrier signal. For example, if the station frequency is 570 KHz, modulation by a 1 KHz musical tone creates two other frequencies, or sidebands, one being 571Khz and the other 569 KHz. Therefore, signals in the range of 569 to 571 KHz need to be passed along, to avoid distortion of the final demodulated signal, with a bandwidth of 2 KHz. Because TRF sets tune over nearly a 3-to-1 frequency range, its bandwidth is too wide at one end and not wide enough at the other. (If it is too wide, it picks up more than one station at a time if they are nearly the same frequency.) The inventor Edwin Armstrong solved this problem, enabling radios to receive and separate many more stations, so the FCC could allocate many more frequencies without there being lots of interference between them. His scheme makes use of a tunable oscillator and a *mixer* to produce a single frequency signal for all desired stations. That signal can be amplified and processed in the same way as a TRF set tuned to one frequency. The new frequency is called the "intermediate frequency", or I.F. frequency – usually 455 KHz in modern superhet AM radios. The bandwidth now remains constant.

Mike drew a block diagram of a superhet radio while explaining the function of each element. He also had brought an elaborate set of test equipment and a radio to use for demonstration. Using a test oscillator, an oscilloscope and a typical radio, he was able to show the results of tuning the radio and the effect on the various signal waveforms, including frequency changes – with and without audio modulation. The setup was used to illustrate that the only difference between AM and FM is the detection process. The equipment showed the operation of the mixer and local oscillator to create the sum of the station frequency and the local oscillator frequencies - adding-up to 455Khz. In fact, both the sum and the difference of the two frequencies appear in the mixed output. Whenever any station frequency is 455 KHz *below* that of the local oscillator there is a 455 KHz resultant signal, causing a undesirable image response. Harmonics in either mixer input can also produce any number of images. To avoid this problem, the FCC assigns frequencies to broadcast stations that are not 455 KHz apart. In some cases there are still problems with this phenomenon, but narrower RF bandwidth provided by an extra RF stage helps. Six-tube sets have this advantage. Some radios are provided with an adjustable trap that can be adjusted to remove the offending signal – which often causes a whistle in the audio. Billy Smith noted that he has such a radio.

Mike set up a demonstration of an operating transmitter and receiver system using two loop antennas and a radio repair training board. Using his oscilloscope, he showed how the bandwidth varied over the tuning range, for the RF section of the radio on the board.

Author's Note: Finally, I know what that trap is for in my Zenith 5S119 radio that I have had for 67 years.

--Bill McKeown


FREE STUFF
ON GROUND
May Swap Meet

Notes from the June 17, 2017 Meeting

Randy James introduced our meeting presenter today… none other than club President Jim Sargent. Jim titled the presentation as "Artifacts of the Telegraph Era". If you have never heard of terms like *hoop stick, sidewinder, glass elbow, crow's foot* or *boomers*, this should have gotten your attention quickly.

After a brief history of the telegraph, Jim displayed many telegraph- related instruments including battery jars used from the 1800's to 1930's, which were generally of the 1 volt to 5 volt variety. Both a new and well eaten up crow's foot were in each jar.

He showed four types of keys: the straight key (early); sidewinder key -- related to glass elbow (carpal tunnel syndrome); the semi-automatic; and automatic keys. Examples included the scarce camel back key, and several sidewinder keys. An example of a resonator box, replete with a Prince Albert tobacco can. A tobacco can was not only a place to store your tobacco, the Prince Albert can could and did change the tone of the resonator box!

A long discussion ensued on codes; American Morse and International Morse.

Eric Kirst showed a key and relay he had found in Dallas. It was a general variety, mounted on a board, most likely for practice, until I noticed on the black key knob the name Herve, crudely carved in it. I've seen the name Herve on several occasions and the person was in fact a Dallasite, who I heard was a semi-pioneer in radio collecting and wireless in the area.

Billy Smith also committed on his displayed sounders, relays and a resonator box from an early railroad station.

George Potter displayed and explained an early E.S. Greeley Victor key circa 1880's. This key was shown on the TV series Texas Storage Wars over a year ago. Briefly, General Edwin S. Greeley and Luther G. Tillotson formed a large manufacturing and distribution company of telegraph Instruments from about 1865-1885, primarily selling to railroads and telegraph companies. This continued until the Panic of 1893 when several railroads became defunct, as well as E.S. Greeley & Company.

Jim showed a genuine hoop stick from Arkansas, which was made of bamboo and used by train engineers to grab messages going through a train station without stopping. This was the only hoop stick I have ever physically seen in all my years of collecting.

--George Potter

The Case of the Pixie Jewell

By Mike McCarty

At the spring swap meet in 2016 I purchased a little "beach radio" for $2.00. It had some slight condition problems, like missing knobs, wear on the snake skin patterned tolex cover, and the carrying strap was gone, but something about these little tube radios appeals to me. This one measures only 6 1/2 inches high by 4 3/4 inches wide by 4 1/2 inches deep. The only indication of a model was the name "Jewel" on the front, but inside the cover. After some significant looking on the internet, I found it was marketed as the "Pixie".

Someone had left an "A" battery (a D cell) inside some time in the past, and there was significant rust and corrosion. I taped paper around the speaker to keep rust dust from getting into the speaker magnet, and about two hours of constant work with some 80 grit sandpaper got most of the worst of it off, certainly all the soft stuff which would continue to rust, but it still wasn't perfect. Still, the chassis would not be visible except when replacing batteries, so functionality was the goal.

After replacing six paper and one electrolytic (which looked like a paper) capacitors, and one out of tolerance resistor, I hooked up a D cell and a 67.5 V "B" battery, but no joy. No reception.

A normal first examination would be to see whether all tubes "light up", but with these little battery sets it's very hard to see whether the filament is getting hot. I needed to use other troubleshooting techniques.

I turned up the volume control to full and touched the center terminal with my finger. I got a loudish buzz, so it looked like the audio tubes were doing their jobs. That left only the converter (1R5) and IF stage (1T4) circuitry. I hadn't been able to find any service literature on the set, so I just used some ballpark figures for voltage measurements from the "typical operating conditions" of a tube manual.

Since the oscillator grid develops its voltage by rectifying its own signal, the presence of negative voltage there indicates that the local oscillator is working. It looked like the oscillator section of the converter was working fine, and other voltages were ballpark.

I made a guess that the IF was 455 KC, and set my signal generator and hooked it to the signal grid of the converter. I got some signal, and after some tweaks of the IF transformers, got lots more signal. Still no reception. This pointed to some problem in the antenna circuitry.

I measured the resistance between the signal grid of the converter tube and the automatic volume control (AVC) filter resistor. It was infinite. The only thing in that circuit is supposed to be the antenna coil, so it looked like it might have a problem. Hmm. Where is the antenna coil?

Careful tracing of the connections from the antenna tuning condenser section and the rest of the radio ended up at two little flexible white wires going from the chassis, around the hinge of the front cover, and then terminating in air. I could see where some glue had held the antenna coil (a flat pancake like thing) to the inside of the front cover, and a little brad which would have held a stiff decorative paper to cover it up. Close examination of the photo I had found on the internet revealed the little wires going under such a cover, and this one was missing, along with the antenna coil.

Since I already had some time invested in this little radio, I decided that throwing good time after bad was the only way to go.

My plan was to calculate the inductance for the coil, and then design one to replace the missing one, and glue it inside the cover. I measured the capacitance range of the antenna tuning condenser, and computed that I needed 150 micro henrys of inductance. After looking up the formulas on the internet, I computed a replacement coil, but it needed several tens of turns, and must be kept flat, and looked like a bad job to do by hand to me. What was Plan B going to be?

I have a Box o' Coils in a storage shed, containing several antenna coils taken from who knows where, but which looked like one might do the trick. I measured several on a little Heathkit bridge I have, and none was close. I did find one whose core was long gone, and a core which was too small to fit properly, but by inserting the core just the right amount, I was able to achieve the proper inductance. I had a coil about 3/8 inch diameter on a 1/4 inch core which might work.

I tack soldered the coil in, set the core to approximate location, and turned on the radio. Bingo! Stations all over the dial.

Since I still lacked service literature, I decided to do a rough 'n ready alignment to get the antenna coil right. I guessed that the highest frequency the set was intended to receive was 1600KC. There is, conveniently, a Vietnamese language station near my work bench at exactly that frequency, and I used that as my signal source, being a lazy sort. I opened the tuning condenser to fully unmeshed, and adjusted the trimmer on the local oscillator so 1600KC came in. I then tuned to 1500KC and adjusted the antenna trimmer for maximum reception. That set the tracking error to zero at 1500KC.

The tuning of a superhet receiver is set by the intermediate frequency and the frequency of the local oscillator. The purpose of the antenna circuitry is three fold. It captures the signal, it provides some resonant amplitude increase, and helps reject image frequencies. It does not set the tuning of the radio. It is important, however, that the antenna circuitry be set as nearly as possible to the frequency the radio is tuned to, or it will discriminate against the desired signal. The difference between the frequency the radio is tuned to and the frequency the antenna circuitry is tuned to is called the tracking error.

One doesn't want the tracking error to be zero at the exact ends of the tuning range, because one can achieve a lower worst case error by setting the tracking error to zero slightly inside the tuning range. For the AM broadcast band, the optimum frequencies to set zero tracking error are usually about 700KC and 1500KC.

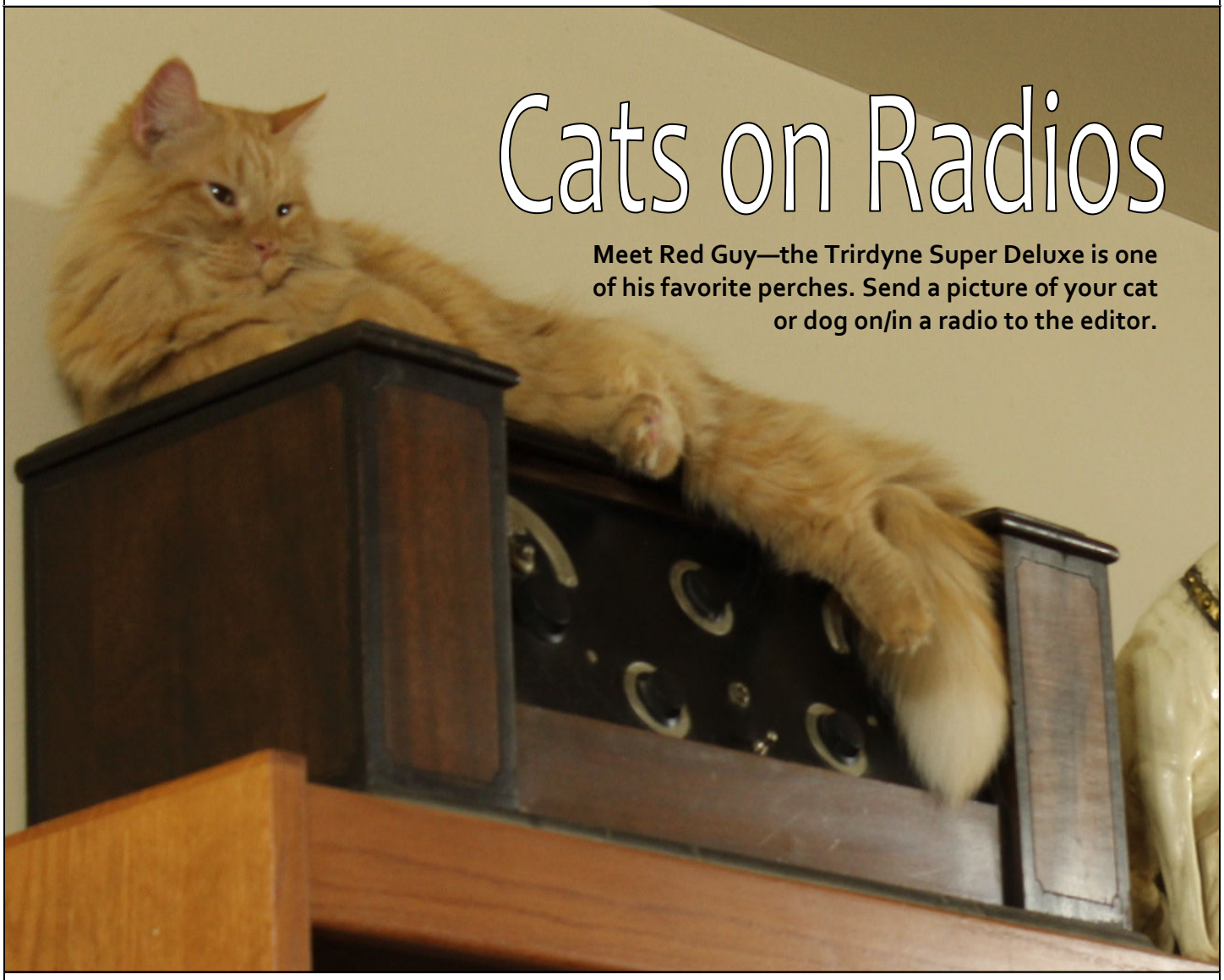
The tracking error in this receiver would be set by the values of the trimmer on the antenna tuning condenser, and the value of the antenna coil. The antenna coil inductance would have about equal effect over the entire band, but the trimmer condenser is in parallel with the main tuning condenser antenna section. At 550KC the trimmer is in parallel with about 360pF of capacitance, adding another 20 to 40 pF. At 1600KC it is in parallel with about 20 to 40 pF, adding another 20 to 40 pF. As it is easy to see, the trimmer will be much more effective at the high end of the band. That's why I set the trimmer at 1500KC.

I then set up my signal generator to produce a signal at 700KC, and tuned the radio to that frequency. I then adjusted the core of the antenna coil for maximum reception at that frequency. I retuned to 1500KC, and adjusted the trimmer, and repeated the adjustment of the core at 700KC. After a few trials, no further adjustments were needed. I then melted some candle wax into the coil to hold the core in place.

I tucked the new coil into a nook beside the "B" battery, and the electronic repair was complete. I closed up the case, and added a couple of knobs I had lying around which looked not completely unlike the originals, and the radio works great!

Since the repairs were done, I found the service literature for the radio, and discovered that the top end of the tuning range is actually 1620KC. Somehow, I haven't gotten up the gumption to redoing the alignment.

—- Case Closed —-



Cats on Radios

Meet Red Guy—the Tirdyne Super Deluxe is one of his favorite perches. Send a picture of your cat or dog on/in a radio to the editor.

Sargent Auction Service will be conducting another sale of vintage radios and phonographs on July 29th at our Garland location. Watch our website, www.sargentauction.com for updates and notices when pictures are posted. As always, this will be a live and internet sale via Live Auctions - Collectible, Antique, Coin and Firearm - iCollector.com This will be a good sale with lots of items. We appreciate your business and look forward to seeing you at the auction.

SoundWaves is published quarterly by The Vintage Radio and Phonograph Society, Inc.

President—Jim Sargent (972) 742-8085
bsargent @swbell.net

Vice President—Randy James (817) 881-0974
randy-jeannine@sbcglobal.net

Newsletter Editor—Mary Ann Caruth
mcaruth@att.net

Webmaster—Mike Grimes k5mlg@verizon.net

VRPS, INC.
P.O. BOX 165345
IRVING, TX 75016

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MONTHLY MEETING PROGRAMS 2017

NOTE: Programs will be held at various locations in Irving, Texas. Make note of the location as they may change from time to time. Senter East, 228 Chamberlain St.; or Garden and Arts, 906 S Senter Rd. Maps are located on the WEB site, www.VRPS.org EVENTS page. Programs start at 2pm. unless otherwise noted. Call us on the cell tellie if you get lost: 972-898-7251 or 972-742-8085.

- **JULY 15— REPAIR SESSION — SENTER EAST-- 8 AM-12 NOON**
- **AUGUST 19 — *KILGORE BROADCAST MUSEUM TRIP ---SENTER EAST ---8 AM *SEE NOTE**
- **SEPTEMBER 16— TAILGATE SWAP MEET —- SENTER EAST ---8 AM-12 NOON**
- **OCTOBER 21 — JIM SARGENT— "COLLECTING RADIO BOOKS & MAGAZINES" — SENTER EAST 2 PM**
- **DECEMBER 9 —- ANNUAL CHRISTMAS PARTY --- SENTER EAST -- NOTE NEW TIME:1 PM-5 PM**

***NOTE – PLEASE MAKE RESERVATION WITH LARRY LINDSEY (BELOW) TO ATTEND. MUSEUM ADMISSION IS $5 AND TRANSPORTATION IS $10.**

Programs are subject to change, contingent on scheduling conflicts. As always, your suggestions for programs/content are welcome. If the programs do not fit your needs and you want something different, let me know. I need volunteers to organize other programs, so consider presenting a program yourself.
Call anytime or send an email: **Larry Lindsey email: pipilindsey@tx.rr.com telephone: 817-312-8761.**.