



The *ORC* Newsletter

Official publication of the Ozaukee Radio Club, Inc. Email all contributions to the editor, Bill Shadid, W9MXQ (W9MXQ@TWC.com). Permission to reprint articles published in any issue is granted provided the author and the Ozaukee Radio Club Newsletter are credited.



ORC Repeaters on 146.97 (-127.3PL), 224.18 (-127.3PL), 443.75 MHz (+127.3PL) - Callsign W9CQO

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Volume XXXIII

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Number 12

From the President

de Pat Volkmann, W9JI



Elections will be the focus of the January Club meeting. Tom Ruhlmann, W9IPR, will be chairing the nomination committee rather than Ken Boston, W9GA, as reported last month. Ken is currently a Club officer and was not eligible to be on the nomination committee. Anyone interested in running for office should contact Tom at teruhlmann@wi.rr.com. A big thank you to Tom for once again helping out with nominations.

Would you like to help the Club but don't care to be an officer? The Club has a number of positions and committees that take care of various activities. These include the Field Day Committee, Spring Swapfest, Fall Swapfest, Scholarship Committee and others. We would not, for example, have a Swapfest without a person to organize the event and volunteers to help out. These activities do not require a large time commitment and can be flexible to accommodate your schedule. A list of the positions can be found on the ORC website. We are currently looking for someone to take over as Club Historian and Membership Chairman. If you value, the Club and all that it provides then please consider helping out.

Last month I reported that Club member John Palese, WB9JPH (SK), had passed away. Nancy Stecker, KC9FCK, our Sunshine Committee chair told me that the Club had received a card from John's family expressing their thanks for the Club's ARRL contribution in John's name and the support of Club members.

We are working on another Key Up contest for the repeater, The last one was popular and many of you have asked for a repeat. We are working on some rule changes which should make things a bit more competitive and increase the opportunity to work more stations. At this point it looks like the event will start in mid-January. Look for an announcement on the email reflector with updated rules.

My most recent shack project was replacing the power transformer in a National HRO-50T-1 receiver. The replacement was a modern part and I had to make an adapter plate to fit it in the radio. It turned into quit a project!



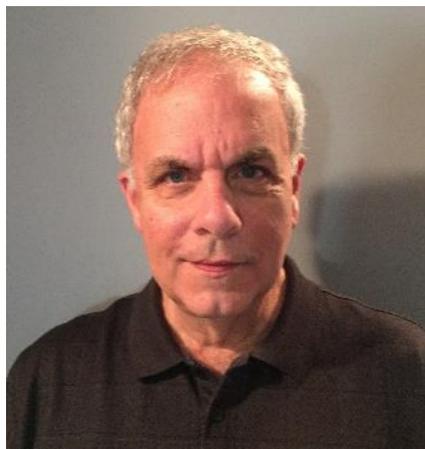
National HRO-50T-1 Receiver ca. 1951
Photo by W9JI

See you at the meeting.

Pat Volkman, W9JI

A Message from the Editor

de Bill Shadid, W9MXQ



Just a quick note here about this month's content:

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THE COMPUTER CORNER

No. 285: Which Anti-? App is Best, and Two Case Studies

De: Stan Kaplan, WB9RQR
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Majorgeeks.com, my absolute favorite site for safe, effective, and free (mostly) software, recently did an informative article on anti-malware applications, including comparisons. They pointed out that anti-malware is the new term, and it covers viruses, malware, spyware, worms, Trojans, rootkits, rogues, adware, PUPs and even more, all gathered and now considered as *malware*. You really ought to read this one-pager by Tim Tibbetts of Majorgeeks. To quickly reach the article, copy these two lines and paste them in your browser, or else just control-click the lines below. Ignore the 2018 date shown below; it was written in April 2020 and so is less than a year old as of right now. It is safe, as is all of Majorgeeks.

https://www.majorgeeks.com/content/page/which_anti_malware_app_is_best_and_can_it_run_alongside_my_anti_virus_2018_edition.html

Read the article, and if so inclined, click the hyperlink in the article to lead you to AV-Comparatives for more in-depth and more updated analysis. The upshot seems to be that (pushing aside all the hype and confusion generated by companies that want to sell you safety) the Windows Security Center that comes with Win 10 does a good basic job. Personally, I really like Malwarebytes added as an above and beyond anti-malware application, mostly because it seems to sit right in the face of malware a bit better. But that is a personal preference. The Majorgeeks article seems to show that it is not really necessary to spend anything on additional protection other than what comes with a Windows 10 installation that is kept up to date. So put that in your pipe and smoke it!

Now, before I leave you, let me relate two personal experiences that prove beyond a shadow of a doubt that the person at the keyboard plays an even larger role in protection than does any anti-malware software you might obtain.

1. My wife, Nancy (KC9FZK) was surfing the web for a recipe for a beef roast. She chose a recipe to look at more closely when a message came up on the screen telling her that her computer was totally locked, and she must click on a certain web site to unlock the machine. She yelled for me. The machine was unresponsive and locked – no keyboard entry was reflected. I did not test the mouse, but immediately shut down her laptop *by pressing the main power button*. The power went off; I waited perhaps 30 seconds to allow the memory to bleed electrons and started it up again with the main power button. It restarted normally and all was good after the restart. I told her to continue surfing for her recipe but **not** to visit that last site. She did so and got her recipe without further incident. I later did a Malwarebytes scan just for safety, but no problems or infections were found.

So that was a successful encounter with a bad actor. The next one was not successful.

2. I service several computers for friends using AnyDesk to remotely control the computers to update it and fix any problems. One is a couple with a desktop Win10 machine. The husband is completely computer illiterate and does not touch the machine. The wife can surf but is not much better at computer literacy or the dangers, and I have encouraged her to contact me by phone immediately if there were problems, besides my updating and checking her machine. Just like my Nancy, the wife was surfing for recipes. She encountered the same demanding message and went to the site! Moreover, she gave them her bank routing number and authorized the payment of \$300! Luckily, they released her machine as they said they would. When I asked her why she did not call me for help, she said she did not want to bother me! My advice to her was to immediately contact her bank with the full story and ask them for advice on how to proceed. I do not know if she did, and what they might have told her.

OZARES: Ozaukee Amateur Radio Emergency Services

by Don Zank AA9WP, OZARES Emergency Coordinator

The Attack of the IMOANS



On November 4, our normal Thursday evening net was interrupted with an Emergency Message:

“Imoan aliens have invaded Ozaukee County X The Imoans have taken over communication towers including all cell phone and repeaters X Communication is intermittent X Mass evacuations are possible.”

As members checked into the net control station (NCS), Naomi, KC9YES (who is also the instigator of this exercise), became very busy. Besides checking in the members, she was developing plans on where best the operators could be virtually deployed. The operators, while readying themselves for their virtual deployment, were thinking about the best modes of communication and what frequencies to use. It was not your normal OZARES net!

Virtual assignments included the Emergency Operations Center’s (EOC’s) in Port Washington and Saukville, the two Ozaukee Hospitals, Ozaukee/Washington County Public Health and two virtual shelters and damage assessment.

To keep things simple at the beginning it was decided that communication modes should be FM voice on VHF and digital WINLINK, either VHF or HF. The only frequencies available for operation were our simplex channels because the repeater towers had been taken over. And using the simplex frequencies became our first big test. Because of the distance between our members located in Ozaukee County, including a guest from Sheboygan County, stations had a difficult time connecting to each other. We were dependent on relays to pass messages. This challenge provided, and this is the whole point of the exercise, several great learning opportunities.

First, when directing operators to another frequency the OZARES channel number and operating frequency must be announced. Then one channel or frequency should be assigned as primary and the other as the auxiliary or tactical channel.

Second, because of the activity going on, one NCS is insufficient. A back up or auxiliary net control station (ANCS) should be assigned. Then the primary NCS can maintain control of the primary channel and the ANCS can work the auxiliary or tactical channel. And from lesson two rolled Lesson Number Three. All operators should be using an ICS-214 form, which is basically an Activity Log. On the ICS-214 form information detailing the stations that have checked in and operator assignments can be logged. So, if an operator is assigned as the ANCS they would be ready to roll. Operators should also be logging all of their activity on the ICS-214, including any transmissions or messages

passed, during the exercise or operation. Notes, updates, and changes can also be recorded on the 214 form.

Our exercise continued the next week using the WINLINK system and generating messages played a large role. Forms included two request forms: the ICS-213-RR, and the Red Cross 6409. WINLINK also has a weather reporting form that was used in the exercise. Thanks to Dave KD9JYL for that portion of our exercise.

This is not your normal OZARES exercise. This exercise is much different from anything we have done before. It is more like a sport training camp. If we run into difficulties or have a training moment we can stop, move back to the repeater, and either correct the problem or provide immediate feedback. This makes the time and effort going into the exercise much more effective and efficient. As an example, when we passed a message among the group using the ICS-213 form, several minor errors occurred. Those errors were corrected immediately, and everyone benefited from the feedback.

While this is a very interesting and fun exercise it does require much more time than the normal 15-minute nets. They are running about an hour long, which makes for a long night for some members that need to get to work the next day. So, we are changing the starting time to 7 pm on the first and second Thursday of the month. The third Thursday will still be the monthly meeting time and the fourth is either the Statewide VHF net on the WECOMM network, or if there are five Thursdays, then an additional net. The Statewide VHF net is always on the last Thursday of the month. If you have the opportunity, please check in or just listen in sometime. See if OZARES can overcome the communication blackout created by the IMOAN's.

OZARES repeaters are on 147.330, +, 127.3 PL and 443.525 +, 114.8 PL.

Vintage Magazine Cover Art

de Pat Volkmann, W9JI



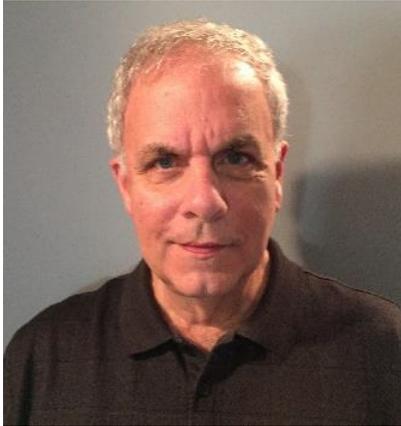
Our cover this month is from the December 1921 issue of QST magazine. At this time, there had been no confirmed contact between amateurs in the USA and Europe. The first Transatlantic test was held in February 1921, with no success. Considerable preparation was made for the December tests. Paul Godly, considered the best short wave receiver man in America, traveled to Scotland to set up a receiving station. Godley used a regenerative Superheterodyne with 5 stages of amplifications and a 1300-foot Beverage antenna. Success was realized on December 10th when 1BCG was heard on 230-Meters. Most of the transmitters heard were CW stations, which lead to the demise of spark gap transmissions.



QST cover Courtesy December 1921 QST

Vintage Amateur Radio

de Bill Shadid, W9MXQ



Some of my favorite vintage linear amplifiers have been those using 811A final amplifier tubes. Amplifiers equipped with the original 811 and subsequent 811A tubes¹ have ranged from just after World War II to current models from Ameritron². This article chronicles one of the best of the breed and an amplifier that was first marketed in the 1960's with the original release of the Collins S-Line separates (75S-1 Receiver and 32S-1 Transmitter) along with the KWM-2 and KWM-2A Transceivers. I am speaking of the table-top, completely self-contained Collins 30L-1 Linear Amplifier.

At the time of its introduction in 1961³, the Collins 30L-1 offered maximum legal power for an amateur radio operator at 1,000 watts plate input power on both CW and SSB. Like all Collins transmitters of that time, there was no published rating for AM operation.

The 811 Triode Transmitting Tube, introduced by RCA in around 1938⁴, was updated to the 811A version shortly after World War II⁵. The 811A Triode has a plate dissipation of 65-watts.



The Collins 30L-1 Linear Amplifier

W9MXQ Collection

The 30L-1 lends itself to easy installation in that it has internal circuitry to switch between being in-circuit and out. This now common feature in amplifiers was not common in the 1960's. At that time, the amplifier merely accepted driving input and provided high power output. Feedline switching was totally at the discretion of the operator. This presented problems, especially with transceivers. Transceivers used the same feedline to

send signal to the internal receiver or transmitter. That means that in receive the signal would be fed through the amplifier. While this could work after a fashion, there could be a lot of attenuation close to the position to which the amplifier is tuned. Also, it was not possible in that kind of setup to run the transmitter straight to the antenna, not using the amplifier.

Amateurs at the time would fabricate their own DPDT (double-pole, double throw) relay to provide proper by-pass of the amplifier. Companies at the time, including DowKey and P&H Electronics, offered commercial relays for the purpose. At that time, I was using a Hallicrafters HT-45 Linear Amplifier and homebrew switching relay setup.

Collins had the most easily adapted linear amplifier for any 70 to 100-watt output station. The 30L-1, for instance, would have been plug and play with my Hallicrafters SX-117 Receiver and HT-44 Transmitter when I acquired that Hallicrafters station in the 1960's. Here is how the Collins S-Line and KWM-2A look with the 30L-1 Linear Amplifier:



The W9MXQ Collins S-Line Station – Pictured from my QRZ Page
30L-1 Amplifier, 75S-3B Receiver, 312B-4 Console, 32S-3 Transmitter

W9MXQ Collection

You will also note the vintage radio operator in the above picture!



The W9MXQ Collins KWM-2A Station
KWM-2A Transceiver, 312B-5 Console, 30L-1 Amplifier

W9MXQ Collection

The same Collins 30L-1 Linear Amplifier is in both above photos. Color differences are from the photographs. Collins was quite good in keeping their color match from year to year. Notice the Round Emblem (later date) Collins emblems on some pieces and the Winged (earlier date) Collins emblems on others. These two emblems, and some even later ones, are covered in earlier articles on the S-Line and KWM-2/2A product lines.

And, finally, here is how the main competition looked in 1964 from Hallicrafters with the HT-45 Linear Amplifier that carried the same specifications as the 30L-1:



**The W9MXQ Hallicrafters Twins Station with their Linear Amplifier
HT-45 Amplifier, HT-44 Transmitter, PS-150-120 Console, SX-117 Receiver
W9MXQ Collection**

And, also from 1964, the competition from Heathkit – across Lake Michigan from Hallicrafters with the similar specification amplifier to the 30L-1 – the Heathkit SB-200:



**The W9MXQ Heathkit Twins Station with their Linear Amplifier
SB-401 Transmitter, SB-600 Speaker, SB-303 Receiver, SB-200 Amplifier
W9MXQ Collection**

The Collins 30L-1 was introduced shortly after its partners, the Collins S-Line Receivers and Transmitters, in 1961. A more commercial and military Linear Amplifier, the 30S-1, a large, floor mounted unit, came to market a year before.

At the time of the 30L-1 Linear Amplifier, the Federal Communications Commission defined maximum power for Amateur Radio Stations as 1,000 watts DC Power Input. This

rule was to include the power from an exciter. That is, the driving transmitter used to “excite” the amplifier into operation. Forgetting for a moment⁶ the “including the drive from the exciter” concept the maximum input power allowed would have been based on a calculation of Plate Voltage time Plate Current not to exceed 1,000. The resulting “1,000” in that formula would have been in watts – and could not exceed 1,000 for legal operation. Typically, the plate voltage on the 30L-1 would be 1,600 volts so the maximum current when the final amplifier is resonated would be just under 630 mA, or 0.630 Amperes.

Later in the 1960’s there seemed to be general agreement between the manufactures that the 1,000-watt maximum input could be interpreted for SSB as average power. So, on SSB one could run 2,000 watts input with a linear amplifier that operated at 50% efficiency and get an average input of 1,000 watts. The rub here was that it would be illegal for an amateur operator to tune up his/her amplifier to resonance at 2,000 watts. You see, for that instance of tuning up, the operator would be illegal. To get beyond this, you will notice that most older generation linear amplifiers (and older generation amplifiers still in production) have a CW and SSB mode selection. Some show that as a CW/AM mode and SSB mode. CW and AM are DC modes (as we reference it) so they are not operating as average power.

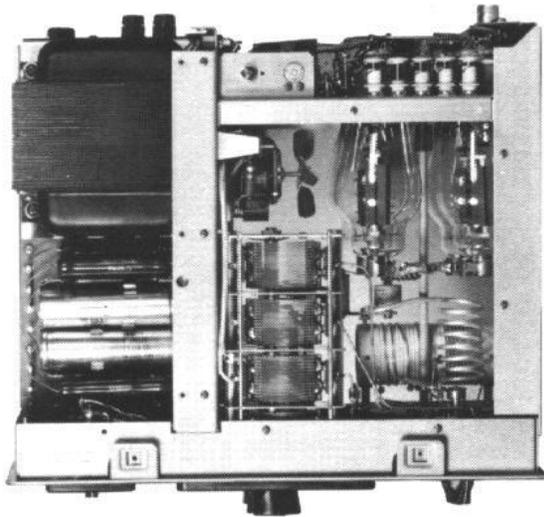
So, to tune an amplifier of the day to maximum power, one would follow the tune-up procedure in the CW mode. When complete, the operator would switch to SSB mode that would significantly increase the plate voltage. In theory, the amplifier was still tuned properly but the higher plate voltage significantly increased the power output. There is one interesting phenomenon here. My Drake L-4B and L7 Linear Amplifiers operate at a CW plate voltage of about 2,100 volts. While on SSB it operates at about 3,200 volts (somewhat less under load). So, a logical question is, why is SSB not twice the 2,100 volts – or 4,200 volts? That is mode and power supply related. Being an intermittent mode, when operating on SSB the plate voltage does not sag as much under load. The idea of average DC power provides at least 1,000-watts output. In truth, even more. Real output is more like 1,200 to 1,400-watts peak output on both mentioned Drake amplifiers. In today’s flat 1,500-watts PEP Output rule that is no problem.

When introduced, the 30L-1 provided about 500-watts output and was rated at 1,000-watts DC (key down) input. Collins rated its much higher power 30S-1 Linear Amplifier at the same power level. It was marketed in the amateur market with instructions for tuning in keeping with legal amateur rules. Of course, “wink-wink,” all amateurs carefully operated at that power and would never have thought of running far more power – as could easily be accommodated. For reference, the power specifications for both the 30L-1 and 30S-1 had the same power specifications. The 30L-1 was correctly rated but the 30S-1 was capable of at least twice or two and a half times more⁷.

The Collins 30L-1 had a nice table-top stance compared to most all other 811A tube equipped amplifiers of the 1960’s and up to the ones available today. To make the 30L-1 fit in a cabinet that matched the S-Line separates and the KWM-2/2A, they mounted the tube horizontally – not vertically like their competition. Collins 30L-1 Linear Amplifi-

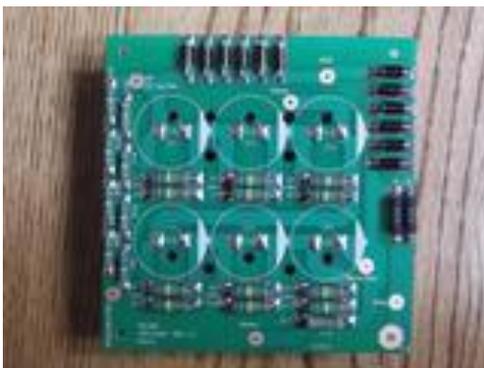
ers used RCA or Cetron tubes that were designed to be mounted vertically or horizontally. In today's world, RCA and Cetron tubes are rare and only available when new old stock is located. Svetlana, the Russian tube manufacturer up to recent times marketed 811A tubes that could be mounted vertically or horizontally. Svetlana no longer makes that line of tubes – but they can be found as new old stock here and there. The Chinese make such tubes but be sure to buy them from a distributor guaranteeing them for horizontal mounting. One such distributor is RF Parts⁸.

The Collins 30L-1 Linear Amplifier seems timeless in that it operates today much like it did when new. That is, as with all older radios, assuming replacement of the aging power supply capacitors and diodes. My own Collins 30L-1's (I have one now and had a different one in the past) had their high voltage electrolytic capacitors, rectifier diodes, and by-pass resistors replaced with third party restoration boards. Both of my 30L-1's used a retrofit board from Young Kim, K6HM⁹, in California. Kim is widely known with Collins collectors as having one of the best quality units. (Kim is also a vintage Collins collector.) However, another high-quality retrofit board comes from Harbach Electronics, in Ohio¹⁰. While I do not just flat out replace capacitors and diodes in vintage equipment – I do so in high voltage circuits.



At the left here you can see in interior view of the Collins 30L-1 Linear Amplifier the Power Supply and separate RF Area shields removed. This picture, from the 30L-1 Technical Manual, does not show the more modern retro-fit power supply board installed at the lower left hand corner of the radios.

Note the horizontally mounted tubes. Two are shown with the other two just below them. See also the small cooling fan, the large Load Capacitor at the left and the tank coils. The Plate capacitor is under the Load capacitor. **W9MXQ**



To the left is the Young Kim, K6HM, retro fit HV Circuit Board. The capacitors are on the understand of the board. The HV diodes are shown across the top and the top right, The equalizing resistors are on the left and under the capacitor rows. The Harbach board is equally well designed and of excellent quality.

W9MXQ

Here are performance numbers for the Collins 30L-1:

Collins 30L-1 Linear Amplifier Performance Specifications		
Mode	Input	Output
PEP SSB	1,000	500 – 600
CW	1,000	500 – 600

It is important to remember that Collins designed the 30L-1, the S-Line, and the KWM-2/2A to be used by the amateur, commercial, and military market. As such, they cover from 3.5 to 30 MHz

Collins advises that the input circuits may need adjustment for operating in places outside the amateur bands. However, I have successfully used my KWM-2A Transceiver with my 30L-1 Linear Amplifier on the 17-meter and 12-meter bands with no issues in the KWM-2A or the 30L-1. Your experience may be different – so be aware.

Frequency Coverage Allowed – with Alignment* of Input Coils		
Band Switch Setting	Lower Limit Mc. (MHz)	Upper Limit Mc. (MHz)
3.5	3.4	5.0
7.0	6.5	9.5
14.0	9.5	16.0
21.0	16.0	22.0
28.0	22.0	30.0

(* Alignment only if required.

Collins 30L-1 Technical Manual, Table 4-1

Here is another interior view of the amplifier – showing the interior shielding:



Here is a view of the 30L-1 Linear Amplifier with the cabinet cover door open. Compare this with the above interior picture and see both the Power Supply (left) and RF Compartment (right) covers in place. See also the unique punch pattern for the RF Cover that allows the model number to be silk screened in the active area of ventilation holes. The 30L-1 is an impressive mechanical design. That and the electrical design have withstood the test of time.

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The Collins 30L-1 uses grounded grid RF input design and thus needs about 70-watts of RF drive from the exciter. Unlike amplifiers of the day, the input circuitry in the 30L-1 insures a 50-ohm impedance for the exciter. While this was not as critical at the time of all these products, it was critical for the Collins S-Line Transmitters and Transceivers.

That point makes the 30L-1 one of the best partners to use with modern, solid-state exciters.

Speaking of partnering with modern radios, the Collins 30L-1 Linear Amplifier in this article and virtually all linear amplifiers from this era required high current at high voltages to switch between transmit and receive. This was no problem for transmitters and transceivers of that same era. However, modern exciters can only accommodate low voltages (5 to 12-volts) at low current (on the order of a few mA). Interface units are available from several manufacturers for this purpose as well as modification circuitry for the amplifier to make it compatible with modern radios. I reference but am not limiting you to the Ameritron ARB-704¹¹ for this purpose. Other options exist – including modifications to the amplifier itself. Some large chassis Yaesu radios have internal relays that can be activated in menu to provide interface with older amplifiers. But be sure the current draw from the amplifier is not too high for even that relay. If you do not know how to measure the required current, buy the Ameritron ARB-704, or one of the several competing units. Most of today's radios do not give you a second chance with said switching – the first time you make a mistake and draw too much current from an old amplifier's switching circuit, you WILL destroy the switching transistor in the radio. And, as if that is not bad enough, several Icom radios have an error in their instruction manual on just that point – showing a typing error indicating way more current than the little transistor can withstand. Beware!!

Here are a couple of 30L-1 operations at W9MXQ where the Collins 30L-1 is running with other brands of exciters:



Cubic Astro 103 and Collins 30L-1
W9MXQ Collection



Kenwood TS-830S with Collins 30L-1
W9MXQ Collection

In the above pictures, the Cubic Astro 103 includes an added internal relay for switching a vintage linear amplifier – as mentioned above. The previous owner added that relay. I have now removed it and use the Ameritron ARB-704 Interface with the pair shown. The Kenwood TS-830S uses a large relay internally for amplifier switching – so no interface is needed.



Ameritron Catalog

Pictured at the left is an Ameritron ARB-704. The unit as delivered includes most cabling for vintage radios (or any radio with cables of your own making). Ameritron offers custom cables for current transceivers on the market – and some recent models as well.

Another area involves the AC Mains wiring. The amplifier came from Collins wired for 230 VAC. If you find a used one it could come wired for 115 VAC as a convenience. When returning the amplifier to 230 VAC service, note that the manual is incorrect. My best advice is to carefully examine the circuit and wire the transformer logically, not necessarily by the manual. I have never seen a correct manual.

Whenever talking about the Collins S-Line and the associated accessories, I must repeat something I mentioned in the first article done on the original 75S-1 Receiver and 32S-1 Transmitter as these radios were introduced in 1958. These radios have a feature that was approached, but never exceeded, by their competition – “Desk Presence.” Look again at the Collins station pictures at the beginning of this article and draw your own conclusions. Another subjective comment is to say that the closest of the time competition for that look were the Hallicrafters and Heathkit lines from 1964 – also shown as complete stations, earlier in this article.

I appreciate that you read my articles. Remember that I am open to questions and comments anytime at my email address, W9MXQ@TWC.com.

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a lot more than a proofreader as he often adds commentary that makes it into the article.

Credits and Comments:

¹ Reference three earlier articles in this series on 811/811A triode final amplifier linear amplifiers in the December 2019, February 2020, and March 2020 issues.

² Ameritron, at the time of this writing, markets the AL-811 Linear Amplifier with three 811A tubes and the AL-811H Linear Amplifier with four 811A Tubes. You can find further details on those offerings at <https://www.ameritron.com>,

³ Reference the excellent data website on many Collins Radio Company historical items from Norman Drechsel, WA3KEY. Reference <http://www.collinsmuseum.com>.

⁴ Reference the 1938 Edition of the “Transmitting Tube Data Book” from Radio Corporation of America (RCA).

⁵ Other than “after World War II,” I do not know the year the 811A version of the 811 Triode was introduced. Other than nomenclature printed on the tube and power handling specifications, the difference between the two versions is limited to some extra fins on the 811A’s anode structure.

⁶ My first commercial Linear Amplifier was a 1,000-watt input Radio Industries Loudenboomer. Radio Industries later became the Kansas City plant for Hallicrafters and the Loudenboomer became the Hallicrafters HT-45. My long-time friend, Bob, W9DYQ, now has that original Loudenboomer. I remember carefully monitoring my power input to the final of the amplifier to hold it to 800-watts. 200-watts from the exciter plus the 800-watts – for a total of 1,000 watts input.

⁷ The Radio Industries Loudenboomer and subsequent Hallicrafters HT-45 Loudenboomer Linear Amplifiers were capable of far more than 1,000 watts input. The Collins 30L-1 had a total plate dissipation of 260 watts (4 times the 65-watts for each tube). The two Loudenboomers had a total plate dissipation of 400-watts with their Eimac 3-400z tube. At the time of their manufacture, the companies kept the printed specifications compliant with the law. The Heathkit SB-200 used two of the Cetron 572B Triode with a 160-watt dissipation – a total dissipation of 320-watts. The 572B – a redesigned 811A with more than twice power capability.

⁸ The proper 811A tubes for horizontal mounting are available from RF Parts. You can access them at their website, <https://www.rfparts.com/>. BE SURE to mention horizontal mounting.

⁹ Contact Young Kim, K6HM, at this QRZ page address. I have used Kim’s kits in both of my Collins 30L-1 Linear Amplifiers.

¹⁰ Harbach Electronics is at <https://harbachelectronics.com>. I have used Harbach's kits in my various Drake Linear Amplifiers and Drake Transceiver/Transmitter AC-4 Power Supplies. I have one Harbach kit pending installation into a National NCL-2000 Linear Amplifier.

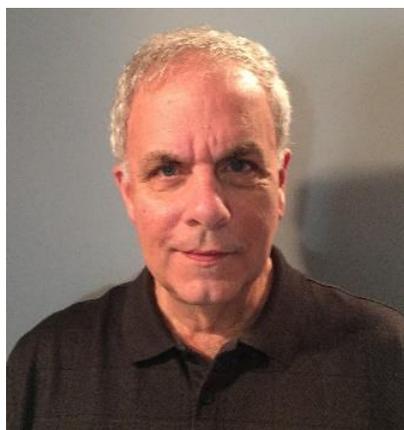
¹¹ The Ameritron ARB-704 is available for most ham radio equipment distributors, including HRO, locally. The website link is <https://www.mfjenterprises.com>. Go to that link and enter "ARB-704" at the time of the page to search for the product.

¹² Other brands of amplifiers mentioned in this article (Hallicrafters, Heathkit, and Radio Industries have been the subject of detailed articles by this author. Contact me for article details at W9MXQ@TWC.com.

© W9MXQ

Hammarlund Hullabaloo!!

de Bill Shadid, W9MXQ



On 19 through 21 November 2021, the High Appalachian Mountain Amateur Radio Society operated what is called the "Hammarlund Hullabaloo!!" Special Event station. They used special callsign, W4H.

This was in celebration of the anniversary of the opening of the new Hammarlund Manufacturing Company facility in Mars Hill, NC, 70 years ago, in 1951. Also, 19 November would be the 170th birthday of Oscar Hammarlund, founder of Hammarlund Radio Company. He was born 19 November 1861. The Hammarlund radio factory was located in Mars Hill from 1951 to 1973. In 1973, Hammarlund Manufacturing Company went out of business. They left behind many fine amateur radio receivers, transmitters, and accessories., So, as the special event sponsors said, "Crank up your Hammarlund radios and make contact with us!" Contacts with other radios were, of course, also welcomed to play along. Here was the setup at W9MXQ as it worked W4H on SSB . . .



Collins KWM-2 and 312B-5 (1961) with a Hammarlund HQ-170AC-VHF Receiver (1958). Transmitting with the Collins and Receiving with the Hammarlund.

On The Air!

de Gary Sutcliffe, W9XT



When we talk about the sun's effect on radio propagation, we usually talk about sunspots, or at least for the last five years or so, the lack of them. Other than low band enthusiasts, most HF operators love sunspots. Without them, our higher HF bands like 10 and 12 meters are not very exciting.

But there is a dark side of the sun, so to speak. The big one is solar flares. Solar flares can happen at any time but are more common during periods of high sunspot activity. So, they are likely to become more common over the next few years as we get further into solar cycle 25.

Solar flares affect radio propagation in two ways. The first is when the event happens. In addition to the light, the solar flares emit a burst of X-rays. When that hits the earth's atmosphere some nine minutes later, the D layer is ionized. The D layer forms during the day from solar UV light and dissipates at night. The D layer absorbs lower frequency radio signals. That is why we only hear local signals on 80 and 40 meters as well as local AM broadcast stations during the day. The signals are absorbed before they can get to the F layer and refracted back a long distance from the transmitter.

The X-ray burst from a flare can be so intense that the D layer starts absorbing signals at higher frequencies. It can cause a radio blackout called a Sudden Ionospheric Disturbance (SID). Because the X-rays travel here at the speed of light, we have no prior warning.

It is pretty dramatic if you happen to be operating when one occurs. Your first reaction will be that your receiver died, or something happened to your antenna. I have witnessed a few SIDs.

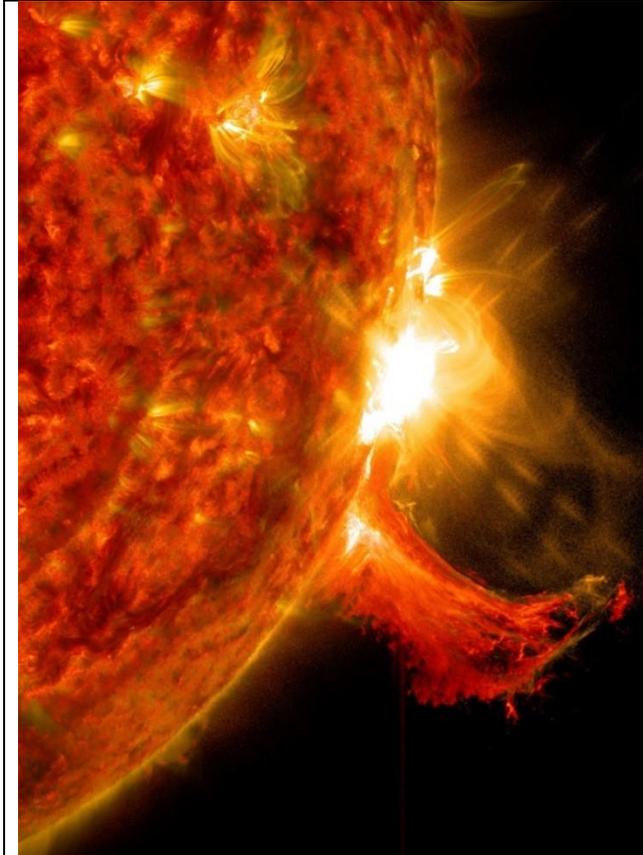
The SID will only occur on the sunlight side of the planet. Usually, conditions will get more or less back to normal in a few hours.

The flare will also eject charged particles in a coronal mass ejection (CME). CMEs can also be produced without a flare. Most of the time, they are ejected in directions away from us and don't cause us problems. But occasionally, they head our way. It takes one to three days for them to make the 93-million-mile trip. When they arrive, they interact with the earth's geomagnetic field causing disturbances or even a geomagnetic storm. Signals traveling near the poles are absorbed, and HF conditions, in general, are poor for several days.

The auroras surrounding the magnetic poles expand and become visible at lower latitudes if we get enough particles. They are beautiful to watch and can be fun for VHF operators. Auroras can reflect signals and communications out to 1200 miles or so are possible.

Aurora reflected signals have a lot of distortion. SSB signals may be difficult to understand, and CW signals have a buzzing sound to them. Instead of sending a signal report of 559, you might send 55A with A standing for aurora.

If the flare is big and directed our way, it could cause big problems. It will create very large auroras, which cause huge currents to flow in long wires. In 1965 an aurora induced current caused the failure of a power transmission line near Ontario, Canada. This started a chain reaction that shut down a good portion of the northeastern US and Canadian electrical grid.



**A solar flare.
The flare is the bright white spot.
NASA Photo**

CMEs can also damage satellites and cause GPS location errors.

A really large flare could cause even more widespread damage. In 1859 the largest CME on record occurred. People as far south as Mexico saw the aurora. Further north, people could read newspapers by the light of the aurora. Telegraphs, the most advanced communications system of the day, were affected. Some worked without their batteries from the current induced in the lines. There were reports of fires being started at some telegraph offices.

The 1859 event was named the Carrington Event after the British astronomer who saw the flare while observing the sun before the particles arrived. He made the connection between the flare and the effects happening on earth.

A Carrington sized event today would be devastating. Our electric grid could be destroyed. Our electronics are based on sensitive transistors and could be burned out. That old tube radio in the closet might be the only radio working, assuming it was not connected to the power lines or antennas at the time, and you had the power to run them.

It would take years to repair the electric grid. Typical lead times for large transformers are many months. Consider how long it would take to replace most of the power lines and transformers for an entire hemisphere, assuming the factories to produce them were still functioning.

Experts who study this have been lobbying the government to harden our electric grid. The estimate is that it could be done from \$2B, a drop in the bucket considering all the trillions of dollars spent on questionable programs recently. If the US was without electricity for a year, millions would die, according to some estimates.

Like the killer asteroid out there someplace, another Carrington Event is only a matter of time. We will get one eventually, if we are prepared or not. Some estimates say they happen on the order of one every hundred years or so. If that theory is correct, we are overdue. Hardening the power grid would also protect us from a nuclear bomb induced electromagnetic pulse (EMP) attack. A single nuclear device detonated about 300 miles above Kansas could affect most of the country.

So why am I talking about this? We had a solar flare at the end of October. There was a SID. I was not on the radio but heard some chatter about it later. This one was not a really big flare, but there was some concern about satellites and GPS problems since it was thought to be directed at us.

It turned out the big part missed us. We had some pretty good auroras, and pictures from around the world started showing up on space weather sites. I went out to look for aurora, but as usual, whenever there is some sort of astronomical event I want to see, it was cloudy in Wisconsin.

We did get some aurora action on 6M. I worked a few stations on 6-meter Aurora on November 4. The mode was CW. They were the first aurora contacts I have made in many years. I worked as far as New England on 2 meters on some really good auroras in the past.

If you hear about an aurora and want to give it a try on the radio, point your beam just a bit east or west of north. SSB signals might be too distorted to copy. Sometimes it sounds as if the other station is whispering. CW is more efficient but sounds like a buzzer. Besides 6 and 2 meters, you might want to give 10 meters a shot.

December Meteor Shower

I talked about working stations off meteor trails in this column several times. Gary, K9DJT, is active most mornings working stations on 6 and 2 meteors with the MSK144 mode in WSJT. WSJT is a suite of different digital modes. If you run FT8, you probably saw it in the mode drop-down tab.

Meteor scatter is more effective during meteor showers. Comets are composed of ice and small rocks. As they orbit the sun, some of the ice evaporates, releasing the solids along the way. As the earth passes through the orbits, the sand and small pebbles enter our atmosphere, where they burn up, producing light and an ionized tube we can bounce radio signals off. The number of comet particles hitting the atmosphere is much

higher than the random ones we usually get. Since you need a string of meteors to complete a QSO, more meteors mean more and faster QSOs.

Meteor showers are named after the star constellation they appear to originate from. A big one peaks December 12-13 but will still be active for a few days before and after. This one is called the Geminids after the constellation Gemini.

Most meteor scatter work is done on 6 and 2 meters, but meteor propagated signals can happen at lower frequencies. By chance, the ARRL 10 Meter contest is at that time. You can work stations during that contest off meteors if you want to give it a try.

You can work stations in the contest on CW or phone. If this is your first time, I suggest phone. It is much faster.

Tune around the band after dark. From time to time, a signal will jump up for anywhere from a fraction of a second to may a half minute or more. If you can copy his CQ, give him a call. He will respond with a signal report and state. Reply in kind.

Now, the meteor trail may not last very long. So be very fast, and don't say anything not necessary. Give your call once phonetically. If you hear someone but didn't get the call, or if you start a QSO but can't finish, stick around on that frequency. Another meteor will probably show up in a minute or two.

Transatlantic Test Centennial

Last month I mentioned that the first amateur signals were heard across the Atlantic 100 years ago this December. The ARRL, RSGB, and other organizations have events planned to celebrate this. The December issue of *QST* has a few articles about it.

The ARRL has a web page listing some of the events. <http://arrl.org/transatlantic>
There will be a QSO party where you try to work W1AW and GB2ZE on 160-meter CW. Special event station GB10002ZE will be active December 1-26. I am not big on working special event stations, but I think I will try to snag this one.

Contests

As mentioned above, the ARRL 10 Meter Contest starts at 6:00 PM on Friday, December 11 local time. You can operate CW, phone, or mixed mode.

The 10 Meter Contest is probably my favorite contest. You can work DX and domestic stations. You might work stations via F layer, Es, or meteor scatter propagation. The band is quiet, and small antennas work well. The band is also large, so there is room to spread out.

Without sunspots the last 4-5 years, it has been more like a VHF contest. As we move further into cycle 25, conditions on the band will improve. As a result, we will likely have a lot more DX than the last few events. At sunspot peak, you will often find the band

packed from 28.300 to 29.500 MHz with US and European SSB signals. It is really amazing.

Vic, WT9Q, has been out to beat me in this contest. For the last few years, we have been placing in the top 5 in the world in our class. Vic's score has always been just a bit below me. He is out for another try this year. It will be an epic battle.

W9XT's contest picks for December 2021 and early January 2022					
Name	Start	Length	Bands	Mode	Link
ARRL 10M Contest	0000Z 11 Dec	48, work 36	10M	CW, Phone, Mixed	http://www.arrl.org/10-meter
160-Meter Transatlantic Centenary QSO Party	0200Z 12 Dec	6 hours	160M	CW	http://arrl.org/transatlantic Work W1AW & GB2ZE
Stew Perry Top Band Distance Challenge	1500Z 15 Dec	48, work 14	160M	CW	www.kkn.net/stew/
Straight Key Night	0000Z 1 Jan	24	All	CW	http://www.arrl.org/straight-key-night

Dates/Times in UTC. Subtract 6 hours from UTC to get local (CST). HF = 80, 40, 20, 15, 10 Meters

The other fun contest this month is the Stew Perry Top Band Distance Challenge. This is a 160 meter, CW only contest. Usually, this is the Saturday between Christmas and New Year's, but since these fall on Saturdays, it is a week earlier December 18.

The thing that makes this interesting is that there are no multipliers. You just get points for each station you work. The points vary by the distance between the stations. A nearby station is only worth one point. DX contacts can be worth 20 points or more. But they can be worth much more. If the other station is running low power, the QSO is worth twice as many points. If they are running QRP, they are worth four times as much. The exchange is grid squares. Your logging program will calculate the number of points, but assume the other station is high power, so they will show up with the minimum point value. If the other station is running low power or QRP and sends in their log, your points are adjusted accordingly. You can look online for claimed scores. You watch your score increase as more low power, and QRP ops send in your logs. Your relative position might change depending on if other stations worked the lower power stations.

It is not really a contest, but if you are getting too old to go out partying and don't want to wake up with a hangover, consider dusting off your old straight key and do some CW on local New Year's Eve for Straight Key Night. It is really not a contest. There is no set exchange and no points or awards. Conversational QSOs with straight keys and mechanical bugs are encouraged. Send in your log and see your call sign in *QST*.

DX

W9XT's DXpedition picks for December 2021 and early January 2021					
QTH	Dates	Call	Bands	Mode	Link/Notes
Bangladesh	Dec 16-22	S21DX	40-10	SSB	https://s21dx.org
Mount Athos	Dec 1-7	SV2RSG/A	160 +?	FT8 +?	

Modes: C = CW, S = SSB, D = Digital (may include RTTY)

A Bangladesh group of hams will activate Manupura Island Dec 16-22. This is part of the Islands on the Air (IOTA) program that activates islands. But as a DXCC entity, Bangladesh is pretty rare. Probably more of the stations contacting them care more about them as a DXCC entity than an island. The path there is challenging, but with increasing sunspots, we might have a shot.

There might be another attempt at Bouvet Island by a group of Polish hams. Their last attempt and another by an international team had to abort without landing due to weather or mechanical breakdowns. It is a very long trip and expensive to go there, and landing on the island is very difficult and dangerous. The Polish group might be making another attempt between December 25 and January 25.

Personally, I think the chances this will occur are pretty slim, but if it happens, it will be the biggest DXpedition event in years. Keep an ear out.

A late notice came out that Mount Athos will be on, and if you act quickly, you might get a chance. Mount Athos is a Greek Island run by a monastery. Access is extremely limited, and the one monk that was an active ham died a few years ago. Due to little activity, this is much needed for DXCC. The word is that SV2RSG/A will be active December 1-7. The focus will be FT8 on 160M, but other bands and maybe modes are possible.

That wraps up this month's On The Air. Have a great Christmas and New Year's!

Ozaukee Radio Club Minutes Membership Meeting of 11/10/2021 de: Ken W9GA, secretary

This ORC meeting was conducted via an online (internet) connection using the ZOOM app. Prior to the meeting start, those members who were able to access the 'waiting room' via phone or computer/webcam were then introduced into the meeting space hosted by Pat W9JI. At that time various audio and video connection issues were addressed for the members before the meeting began.

ORC President Pat W9JI officially initiated the meeting at 7:33 PM, as introductions were recognized when members checked into the meeting, a go-around was not conducted. Tyrel KD9TRX was recognized as a new ham, and a new ORC member.

Program:

The program was presented by Paul, VA6MPM on the "Summits on the Air" [SOTA] program, and his association with the Alpine club of Canada. Paul described his many activations, starting with Banff national park, near Calgary, Alberta, Canada. He also described other activations, and some of the details regarding how the SOTA program works, and that it is a word-wide endeavor.

Committee reports:

Repeater: KC9ONY Tom reported that the repeater system was all working OK.

Treasurer: Gary N9UUR reminded everyone that the 2022 dues are due, and that PayPal can be used, as well as a check mailed to Gary N9UUR to his callbook address He also informs us that the members list on the website is current. The treasurers' report was accepted; motion made by WB9RQR, 2nd by K9QLP, and carried.

Secretary: Ken W9GA reported the October 2021 minutes had been posted; with a correction regarding the treasurer's activity. WB9RQR moved, KD9JNV 2nd, motion to accept carried.

There was no update on the Scholarship/STEM program.

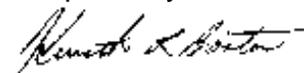
OLD business: None

NEW business: W9JI is soliciting members for the Nominating committee, let him know if interested. The annual dues will remain at \$15 for 2022. Nate KC9TSO gave a brief description of our needs for future expenditures on Field Day equipment, which he is presently storing. It was determined that the club will need an accounting of future costs related to the FD trailers and their maintenance, with attention to the future budget. Pat mentioned that Gregg W9DHI has cleaned up the Website a bit.

Adjournment: WB9RQR moved to adjourn, K9QLP 2nd, motion carried; time ending was 9:00 PM.

Following the meeting breakout rooms for the SOTA program, and a general topic; were opened.

Respectfully submitted,



Kenneth Boston W9GA, Secretary

Upcoming ORC Monthly Meeting Programs

de Pat Volkmann, W9JI

Upcoming ORC Monthly Meeting Programs

November: Paul Mower VA6MPM - Canadian Rockies SOTA

December: Brian Page, N4TRB – Transatlantic Tests in the 1920s

January: Elections

February: Gary Sutcliffe, W9XT – Antenna Basics

March: Chuck Curran, W9KR - Hickok Tube Testers

April: Bill Shadid, W9MXQ - Drake Linear Amplifiers – Features and Failures

Please contact Pat W9JI with your program ideas.

Creating a Presentation

Almost all of our presenters use Microsoft's PowerPoint to organize and present their information. If you don't have access to or aren't familiar with PowerPoint, there is an alternative. The Open Office package contains Impress, which is similar to PowerPoint. Impress is easy to use and available at no charge. You can check out OpenOffice here: <http://www.openoffice.us.com/>

The monthly program is the highlight of the Ozaukee Radio Club meeting. We are fortunate to have a number of very talented people in our club, many of whom have shared their knowledge through a presentation. Share your expertise and experience with the club. Programs can be on any topic that is ham radio related. Contact Pat Volkmann, W9JI, at orc_pat_w9ji@outlook.com to discuss your idea for a program

ORC Meeting Agenda

December 8, 2021

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| <ol style="list-style-type: none">1. 7:15 – 7:30 PM – Check-In and Introductions2. 7:30 PM Call to Order:
President Pat Volkmann (W9JI)3. Announcements, Bragging Rights, Show & Tell, Upcoming Events, etc.4. Presentation: Brian Page, N4TRB:
Transatlantic Tests in the 1920s5. President's Update:
Pat Volkmann (W9JI)6. 1st VP Report:
Ben Evans (K9UZ) | <ol style="list-style-type: none">7. 2nd VP Report:
Bill Church (KD9DRQ)8. Repeater VP Report:
Gregg Lengling (W9DHI)9. Secretary's Report:
Ken Boston (W9GA)10. Treasurer's Report:
Gary Bargholz (N9UUR)11. Committee Reports12. OLD BUSINESS13. NEW BUSINESS14. Adjournment |
|--|--|

Return undeliverable copies to:

The ORC Newsletter

524 Alta Loma Drive
Thiensville, WI 53092

First Class

Meeting Note:

Until the club decides it's safe to hold in-person meetings again, we will be holding the meetings via the Zoom Videoconferencing platform on the same evening and time as we had the in-person meetings. President Pat Volkmann will email sign-in info, W9JI via the ORC remailer usually about an hour before the start of the meeting.

**Next ORC Meeting via Zoom
10 November 2021**

7:15-7:30 PM – Check-In

7:30 PM – Meeting Begins